



Aerospace Medicine
and Biology
A Continuing
Bibliography
with Indexes

NASA SP-7011(272)
June 1985

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Aerospace Medicine & Biology
space Medicine & Biology **Aero**
Medicine & Biology **Aero**
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Biology **Aero** **Medicine &**
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NEW FOREIGN TECHNOLOGY INDEX INCLUDED IN THIS ISSUE **IV**
Medicine & Biology **Aero**
pace Medicine & Biology **Aero**
Medicine & Biology **Aerospace**
cine & Biology **Aerospace Med**
& Biology **Aerospace Medicine**

ACCESSION NUMBER RANGES

Accession numbers cited in this Supplement fall within the following ranges.

STAR (N-10000 Series) N85-17932 - N85-19220

IAA (A-10000 Series) A85-22567 - A85-26196

SPECIAL NOTICE

FOREIGN TECHNOLOGY INDEX IN THIS ISSUE

Documents referred to in this bibliography whose country of intellectual origin is other than the United States are listed in the Foreign Technology Index (see page D-1).

A great deal of excellent scientific and technical work is done throughout the world. To the extent that U.S. researchers, engineers, and industry can utilize what is done in foreign countries, we save our resources. We can thus increase our country's productivity.

We are testing out this approach by helping readers bring foreign technology into focus. We would like to know whether it is useful, and how it might be improved.

Check below, tear out, fold, staple, and return this sheet.

Foreign Technology Index:

- Isn't useful, so should be discontinued.
- Is useful, but other sources can be used.
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AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY
WITH INDEXES

(Supplement 272)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in May 1985 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA)*.



Scientific and Technical Information Branch
National Aeronautics and Space Administration
1985
Washington, DC

NASA SP-7011 and its supplements are available from the National Technical Information Service (NTIS). Questions on the availability of the predecessor publications, Aerospace Medicine and Biology (Volumes I – XI) should be directed to NTIS.

This supplement is available as NTISUB/123/093 from the National Technical Information Service (NTIS), Springfield, Virginia 22161 at the price of \$7.00 domestic; \$14.00 foreign.

INTRODUCTION

This Supplement to *Aerospace Medicine and Biology* lists 360 reports, articles and other documents announced during May 1985 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA)*. The first issue of the bibliography was published in July 1964.

In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which man is subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects of biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. In general, emphasis is placed on applied research, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

Each entry in the bibliography consists of a bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged by *STAR* categories 51 through 55, the Life Sciences division. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* or *STAR*, including the original accession numbers from the respective announcement journals. The *IAA* items will precede the *STAR* items within each category.

Seven indexes -- subject, personal author, corporate source, foreign technology, contract, report number, and accession number -- are included.

An annual index will be prepared at the end of the calendar year covering all documents listed in the 1985 Supplements.

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All publications abstracted in this Section are available from the Technical Information Service, American Institute of Aeronautics and Astronautics, Inc. (AIAA), as follows: Paper copies of accessions are available at \$8.50 per document. Microfiche⁽¹⁾ of documents announced in *IAA* are available at the rate of \$4.00 per microfiche on demand. Standing order microfiche are available at the rate of \$1.45 per microfiche for *IAA* source documents.

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TABLE OF CONTENTS

	Page
Category 51 Life Sciences (General) Includes genetics.	165
Category 52 Aerospace Medicine Includes physiological factors; biological effects of radiation; and weightlessness.	177
Category 53 Behavioral Sciences Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.	190
Category 54 Man/System Technology and Life Support Includes human engineering; biotechnology; and space suits and protective clothing.	200
Category 55 Planetary Biology Includes exobiology; and extraterrestrial life.	211
 Subject Index	 A-1
Personal Author Index	B-1
Corporate Source Index	C-1
Foreign Technology Index	D-1
Contract Number Index	E-1
Report Number Index	F-1
Accession Number Index	G-1

TYPICAL CITATION AND ABSTRACT FROM STAR

NASA SPONSORED DOCUMENT → **AVAILABLE ON MICROFICHE**
NASA ACCESSION NUMBER → N85-11521*# Research Triangle Inst., Research Triangle Park, N.C. ← **CORPORATE SOURCE**
TITLE → **APPLICATIONS OF AEROSPACE TECHNOLOGY IN BIOLOGY AND MEDICINE Final Report**
AUTHORS → B. BASS, H. C. BEALL, J. N. BROWN, JR., W. H. CLINGMAN, R. E. EAKES, P. N. KIZAKEVICH, M. MCCARTNEY, and D. J. ROUSE Apr. 1982 132 p. ← **PUBLICATION DATE**
REPORT NUMBER → (Contract NAS1-16177)
REPORT NUMBER → (NASA-CR-165872; NAS 1.26:165872) Avail: NTIS HC A07/MF ← **COSATI CODE**
AVAILABILITY SOURCE → A01 CSCL 06B ← Utilization of National Aeronautics and Space Administration (NASA) technology in medicine is discussed. The objective is best obtained by stimulation of the introduction of new or improved commercially available medical products incorporating aerospace technology. A bipolar donor/recipient model of medical technology transfer is presented to provide a basis for the team's methodology. That methodology is designed to: (1) identify medical problems and NASA technology that, in combination, constitute opportunities for successful medical products; (2) obtain the early participation of industry in the transfer process; and (3) obtain acceptance by the medical community of new medical products based on NASA technology. Two commercial transfers were completed: the Stowaway, a lightweight wheelchair that provides mobility for the disabled and elderly in the cabin of commercial aircraft, and Micromed, a portable medication infusion pump for the reliable, continuous infusion of medications such as heparin or insulin. The marketing and manufacturing factors critical to the commercialization of the lightweight walker incorporating composite materials were studied. Progress was made in the development and commercialization of each of the 18 currently active projects. E.A.K.

TYPICAL CITATION AND ABSTRACT FROM IAA

NASA SPONSORED DOCUMENT → **AIAA ACCESSION NUMBER** → A85-18152* Albert Einstein Coll. of Medicine, New York. ← **TITLE**
AIAA ACCESSION NUMBER → MECHANISM OF COLOUR DISCRIMINATION BY A BACTERIAL SENSORY RHODOPSIN ← **AUTHOR'S AFFILIATION**
AUTHORS → J. L. SPUDICH (Albert Einstein College of Medicine, Bronx, NY) and R. A. BOGOMOLNI (California, University, San Francisco, CA) → Nature (ISSN 0028-0836), vol. 312, Dec. 6, 1984, p. 509-513. refs. ← **PUBLICATION DATE**
TITLE OF PERIODICAL → (Contract NIH-GM-27750; NIH-GM-27057; NSG-7151; NSF PCM-83-16139) ←
 A photosensitive protein resembling the visual pigments of invertebrates enables phototactic archaeabacteria to distinguish color. This protein exists in two spectrally-distinct forms, one of which is a transient photoproduct of the other and each of which undergoes photochemical reactions controlling the cell's swimming behaviour. Activation of a single pigment molecule in the cell is sufficient to signal the flagellar motor. This signal-transduction mechanism makes evident a color-sensing capability inherent in the retinal/protein chromophore. Author

AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 272)

JUNE 1985

51

LIFE SCIENCES (GENERAL)

Includes genetics.

A85-22853#

RADIATION DOSES AND BIOLOGICAL EFFECTS OF COSMIC RAYS

R. SILBERBERG, C. H. TSAO, J. H. ADAMS, JR. (U.S. Navy, Naval Research Laboratory, Washington, DC), and J. R. LETAW (Severn Communications Corp., Severna Park, MD) IN: International Cosmic Ray Conference, 18th, Bangalore, India, August 22-September 3, 1983, Conference Papers. Volume 2. Bombay, Tata Institute of Fundamental Research, 1983, p. 398-401. refs

During long exposures in space (as on the proposed space station and space habitat), cosmic rays and solar-flare particles pose a significant radiation hazard. Among cosmic rays, the dose due to the heavy nuclei dominates, and considerably so after the high relative biological effectiveness of heavy ions for radiation damage is taken into account. In carrying out the calculations, the energy spectra of the various nuclei were converted into energy deposition spectra (or LET-spectra); propagation (or radiation transport) calculations were carried out using nuclear cross section equations. A set of calculated doses and associated risks is presented: e.g., at solar minimum outside the magnetosphere, behind 4 g/sq cm Al shielding, and at a depth of 5 cm of a biological phantom of water, the dose equivalent is 22 rem/year. This is sufficient to double the probability for contracting leukemia within 20 years after a 4-year exposure. Author

A85-23201

EXPERIMENTAL ATHEROSCLEROSIS IN MIDDLE-ALTITUDE CONDITIONS [TECHENIE EKSPERIMENTAL'NOGO ATEROSKLOROZA V USLOVIIAKH SREDNEGOR'IA]

V. M. IAKOVLEV (Akademii Nauk Kirgizskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Vysokogor'ia, Frunze, Kirgiz SSR) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury (ISSN 0042-8787), Sept.-Oct. 1984, p. 19-21. In Russian. refs

It is shown through a series of experimental investigations with rabbits that tissue respiration and glycolysis are activated in response to hypercholesterolemia at altitudes of 1700 m. Changes in the functional activity of mitochondria were found to decrease the severity of lipid metabolism disturbances. I.H.

A85-23202

EFFECT OF A LOW-FREQUENCY ALTERNATING MAGNETIC FIELD ON THE COURSE OF PYROGENIC FEVER [VLIANIE NIZKOCHASTOTNOGO PEREMENNNOGO MAGNITNOGO POLIA NA TECHENIE PIROGENALOVOI LIKHORADKI]

M. A. SHISHLO, L. A. NIKULINA, and N. B. KIRICHENKO (Tsentral'nyi Nauchno-Issledovatel'skii Institut Kurortologii i Fizioterapii, Moscow, USSR) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury (ISSN 0042-8787), Sept.-Oct. 1984, p. 54, 55. In Russian.

A85-23209

A MECHANISM FOR THE EFFECT OF NOISE ON THE LABYRINTH [O MEKHANIZME DEISTVIA SHUMA NA USHNOI LABIRINT]

S. V. ALEKSEEV, V. F. ANICHIN, and V. V. PAVLOV (Leningradskii Sanitarno-Gigienicheskii Institut, Leningrad, USSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), Oct. 1984, p. 22-24. In Russian. refs

The effect of noise on guinea pig labyrinth receptors has been investigated using an electron microscope. Physiological effects were classified according to the following parameters: (1) narrow band noise (one octave wide) with a geometrical mean in the 2000 Hz band; (2) noise intensity of 100 dB; and (3) an exposure time of six hours. Noise at the given frequency and intensity was found to affect both the cochlear and vestibular zones of the labyrinth. Structural alterations were observed in both the auditory and vestibular cells. It is suggested that vegetative disorders due to noise exposure could be related to morphological changes in the vestibular apparatus. I.H.

A85-23215

THE USE OF ENZYMES TO CORRECT THE IMMUNE RESPONSE UNDER VIBRATION LOADING [PRIMENENIE FERMENTOV Dlya KORREKTSII IMMUNNOGO OTVETA PRI VIBRATSIONNOM VOZDEISTVII]

L. G. PROKOPENKO, G. A. CHALYI, and L. E. IUDINA (Kurskii Meditsinskii Institut, Kursk, USSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), Oct. 1984, p. 43-45. In Russian. refs

The effects of trypsin and lysozyme on the development of immune response under vibration loading were studied in inbred hybrid mice subjected to constant vertical vibration at a frequency of 50 Hz and an amplitude of 0.5 mm for 3 hours a day in the course of 75 days. Both enzymes were found to stimulate the formation of the immune response, with the effect of lysozyme being more pronounced. The vibration was found to produce immunosuppressor properties in the spleen and thymus lymphocytes of mice, and trypsin and lysozyme were found to reduce the immunosuppressor activity of splenocytes and thymocytes. B.J.

A85-23218

EFFECT OF LOW-FREQUENCY ACOUSTIC OSCILLATIONS AND CERTAIN ERYTHROCYTE MEMBRANE COMPONENTS IN VITRO [VLIANIE NIZKOCHASTOTNYKH AKUSTICHESKIKH KOLEBANII NA NEKOTORYE KOMPONENTY MEMBRANY ERITROTSITOV IN VITRO]

V. N. KOLMAKOV, V. I. SVIDOVYI, and A. G. SHLEIKIN (Leningradskii Sanitarno-Gigienicheskii Meditsinskii Institut, Leningrad, USSR) Gigiena Truda i Professional'nye Zabolevaniia (ISSN 0016-9919), Oct. 1984, p. 48, 49. In Russian. refs

51 LIFE SCIENCES (GENERAL)

A85-23224

GRAVITATIONAL ADAPTATION IN FOREST TREES [GRAVITATIONNYE ADAPTATSII U LESNYKH DREVESNYKH RASTENII]

E. G. MININA, N. A. LARIONOVA, and I. N. TRETIAKOVA (Akademii Nauk SSSR, Institut Lesa i Drevesiny, Krasnoyarsk, USSR) Zhurnal Obshchei Biologii (ISSN 0044-4596), vol. 45, Sept.-Oct. 1984, p. 687-693. In Russian. refs

It is shown that adaptation to forest trees is manifested in morphological changes in the crown. The specific relationship between adaptation and crown shape in *Pinus Sylvestris* L. is examined. It is found that an increase in the activity of gibberellic acids may be associated with shape changes in the crown, and may be a mechanism for the weakening of gravitation stimulus perception. I.H.

A85-23225

THE GENETIC SIMILARITY OF MAN AND THE ANTHROPOID APES [O GENETICHESKOM SKHODSTVE CHELOVEKA I CHELOVEKOOBRAZNYKH OBEZ'IAN]

E. IA. TETUSHKIN (Akademii Nauk SSSR, Institut Obshchei Genetiki, Moscow, USSR) Zhurnal Obshchei Biologii (ISSN 0044-4596), vol. 45, Sept.-Oct. 1984, p. 694-699. In Russian. refs

A85-23232

CERTAIN CONCLUSIONS AND PROSPECTS OF STUDY PERTAINING TO THE VASCULAR SYSTEM IN THE CASE OF LIMITATIONS ON MOTOR ACTIVITY [NEKOTORYE ITOGI I PERSPEKTIVY IZUCHENIIA KROVENOSNOI SISTEMY PRI OGRANICHENII Dvigatel'noi AKTIVNOSTI]

M. G. PRIVES and A. K. KOSOUROV (I Leningradskii Meditsinskii Institut, Leningrad, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, Oct. 1984, p. 5-13. In Russian. refs

The effects of limitations of motor activity (such as the hypokinesia experienced in space flight) on the human vascular system are examined. It is found that the blood vessels of all organs (and not only the organs of motion) react to the limitation of motor activity, and that the vessels of different organs react in different ways (which is evidence of their organ-specificity). Of the main arteries, the muscle arteries react most strongly to the limitation. In addition, it is shown that all the changes arising in the blood vessels due to a general limitation of motor activity are reversible, and that they can be normalized, which may lead to a readaptation of the cardiovascular system. B.J.

A85-23233

THE EFFECT OF HYPODYNAMIA ON THE HEMOMICRO CIRCULATORY BED IN RAT TRICEPS BRACHII MUSCLE AND ITS FASCIA [VLIJANIE GIPODINAMII NA GEMOMIKROTSIRKULIATORNOE RUSLO TREKHGLAVOI MYSHTSY I FASTSII PLECHA KRYSY]

M. V. NIKITIN and L. F. SHAFIKOVA (I Leningradskii Meditsinskii Institut, Leningrad, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, Oct. 1984, p. 14-20. In Russian. refs

Observations of structural changes in the hemomicrocirculatory bed (HCMB) of rat triceps brachii muscle due to hypodynamia were carried out for a period of 60 days. It is found that the greatest changes occurred during the first 1.4-4.5 days of observation and took the form of initial congestion of venous blood in the HCMB. Observations 4.5-15.3 days after the onset of hypodynamia showed stable dilation of all venous components of the HCMB, in addition to certain qualitative changes in the arteriolar links. Several photographs are provided which illustrate the structural changes. I.H.

A85-23234

THE STRUCTURE OF THE RENAL ARTERY WALL DURING RESTRICTED MOTOR ACTIVITY [STROENIE STENKI POCHECHNOI ARTERII PRI OGRANICHENII DVIGATEL'NOI AKTIVNOSTI]

G. N. BELOUSOVA (I Leningradskii Meditsinskii Institut, Leningrad, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, Oct. 1984, p. 21-25. In Russian. refs

Changes in the structure of the renal artery wall over a period of 2-16 weeks of restricted motor activity and hypokinesia have been investigated in rabbits. It is found that the artery wall exhibited a wave-like structure after two weeks of hypokinesia and restricted motor activity. Changes in the smooth muscle cell nucleus inside the artery are shown in a photograph. It is suggested that the wave-like structure in the artery wall may be a response of compensatory processes to changes in blood stream and kidney function due to hypokinesia. I.H.

A85-23235

CHANGES IN THE SIZE OF THE LONG TUBULAR BONES AND BODY MASS OF RATS UNDER PHYSICAL LOADS GRADED ACCORDING TO THE TIME OF DAY [IZMENENIIA RAZMEROV DLINNYKH TRUBCHATYKH KOSTEI I MASSY TELA U KRYS PRI FIZICHESKOI NAGRUZKE, DOZIROVANNOI PO VREMENI SUTOK]

L. A. ALEKSINA (I Leningradskii Meditsinskii Institut, Leningrad, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, Oct. 1984, p. 29-34. In Russian. refs

A85-23237

THE STATE OF THE SANGUINEROUS BED OF THE VASCULAR TUNIC OF THE EYEBALL AND RETROBULBAR FORMATIONS IN ASSOCIATION WITH EXPERIMENTAL VASCULAR CONGESTION [SOSTOIANIE KROVENOSNOGO RUSLA SOSUDISTOI OBOLOCHKI GLAZNOGO IABLOKA I RETROBUL'BARNYKH OBRAZOVANII PRI VENOZNOM ZASTOE V EKSPERIMENTE]

S. V. CHEMEZOV (Orenburgskii Meditsinskii Institut, Orenburg, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, Oct. 1984, p. 47-54. In Russian. refs

A85-23241

ANATOMICAL ASPECTS OF THE USE OF COMPUTER TOMOGRAPHY (REVIEW OF THE NON-SOVIET LITERATURE) [ANATOMICHESKIE ASPEKTY PRIMENENIIA KOMP'UTERNOI TOMOGRAFII /OBZOR ZARUBEZHNOI LITERATURY/]

B. A. NIKITUK (Tsentrall'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, Oct. 1984, p. 90-96. In Russian. refs

A85-23252

CELL SURFACE RNA - A POSSIBLE MOLECULAR RECEPTOR FOR ADAPTOGENES [RNK POVERKHNOSTI KLETOK - VOZMOZHNYI MOLEKULIARNYI RETSEPTOR ADAPTOGENOV]

A. G. MALENKOV and I. M. KOLOTYGINA (Nauchno-Issledovatel'skii Institut po Biologicheskim Ispytaniiam Khimicheskikh Soedinenii, Kupavna, USSR) Biofizika (ISSN 0006-3029), vol. 29, Sept.-Oct. 1984, p. 814, 815. In Russian. refs

It is found in a series of experiments with mice that the ingestion of actinomycin D removed the effects of adaptogens after a period of 30 minutes by destroying cell surface RNA. RNA-ase is identified as the mechanism for the destruction of cell surface RNA. It is shown that the destruction of surface RNA may stimulate protein synthesis. I.H.

A85-23253

MAGNETIC SUSCEPTIBILITY AND THE MAGNETIC CAPTURE OF CELLS [MAGNITNAIA VOSPRIIMCHIVOST' I MAGNITNYI 'ZAKHvat' KLETOK]

A. N. SHALYGIN, S. B. NORINA, and E. I. KONDORSKII (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Biofizika (ISSN 0006-3029), vol. 29, Sept.-Oct. 1984, p. 845-851. In Russian. refs

The magnetic capture of human erythrocytes and lymphocytes in paramagnetic and diamagnetic modes of motion near a transversely magnetized wire has been investigated experimentally. On the basis of measurements of the trajectories of the cells, the susceptibility of erythrocytes with various types of hemoglobin (methemoglobin, oxyhemoglobin, and desoxyhemoglobin) was determined, and distribution histograms were constructed. It is shown that any histogram for lymphocyte magnetic susceptibility must take into account the magnetic identification of the cells. A method for determining the content of methemoglobin in erythrocytes is proposed, based on the experimental data. I.H.

A85-23254

THE MECHANISM OF VARIATIONS IN ERYTHROCYTE ELECTROPHORETIC MOBILITY IN RESPONSE THE UHF IRRADIATION [O MEKHANIZME IZMENENIIA ELEKTROFORETICHESKOI PODVIZHNOSTI ERITROTSITOV PRI SVCH-OBLUCHENII]

V. L. SIGAL, P. V. OSADCHII, and A. N. GUSEV (Akademii Nauk Ukrainskoi SSR, Institut Problem Onkologii, Kiev, Ukrainian SSR) Biofizika (ISSN 0006-3029), vol. 29, Sept.-Oct. 1984, p. 852-856. In Russian. refs

A85-23255

AN OPTICAL STUDY OF ELECTROMECHANICAL COUPLING IN HEART FIBERS [ISSLEDOVANIE ELEKTROMECHANICHESKOGO SOPRIAZHENIIA V VOLOKNAKH SERDTSYA OPTICHESKIM METODOM]

A. K. FILIPPOV, R. V. PLOTNIKOV, and V. I. POROTIKOV (Nauchno-Issledovatel'skii Institut po Biologicheskim Ispytaniiam Khimicheskikh Soedinenii, Kupavna, USSR) Biofizika (ISSN 0006-3029), vol. 29, Sept.-Oct. 1984, p. 886-890. In Russian. refs

It is shown through an analysis of frog auricle fibers that the optical recording of contractions in relation to action potential and ionic currents is an effective technique of coronary monitoring. It is found that the technique permits a distinction between tonic contractions due to Ca^{++} input and Na/Ca metabolic diffusion, and phasic contractions due to calcium input into the fiber cells. The regulation of both the phasic and tonic contraction components by pharmaceutical compounds is discussed. I.H.

A85-23257

THE MUSCLE AS A SYSTEM OF PARAMETRIC EXCITATION [MYSHTSA KAK SISTEMA S PARAMETRICHESKIM VOZBUZHDENIEM]

P. LAESSIG and W. HEROLD (Leipzig, Universitaet, Leipzig, East Germany) Biofizika (ISSN 0006-3029), vol. 29, Sept.-Oct. 1984, p. 891-894. In Russian. refs

A mechanical model of oculorotatory muscle function is proposed. The model consists of a neutrally-controlled Voigt element which is located parallel to the mass of the muscle and in sequence with a passive elastic element. The mass of the passive elastic element is given as a linear function of muscle length, and muscle viscosity is given as a function of velocity. The nonlinear Voigt element is given as a time-variable element in order to describe the activation of the muscle. Theoretical estimates of the dynamic parameters of the mechanical model are in good agreement with current experimental data. I.H.

A85-23258

AN ANALYSIS OF THE REGULATION OF NORADRENALINE SECRETION BY AUTOADRENO-RECEPTORS AND FREQUENCY STIMULATION [ANALIZ REGULIATSIII SEKRETSII NORADRENALINA AUTOADRENORETSEPTORAMI I CHASTOTOI STIMULIATSIII]

A. S. BAZIAN, M. B. BERKINBLIT, and B. L. BRODSKII (Akademii Nauk SSSR, Institut Vysshei Nervnoi Delatel'nosti i Neirofiziologii and Institut Problem Perekhodni Informatsii, Moscow, USSR) Biofizika (ISSN 0006-3029), vol. 29, Sept.-Oct. 1984, p. 895-898. In Russian. refs

A85-23259

CONFIGURATIONAL GENERATORS OF NEURAL RHYTHM [KONFIGURATSIONNYE GENERATORY NEIRONNOI RITMIKI]

V. L. DUNIN-BARKOVSKII (Akademii Nauk SSSR, Institut Problem Perekhodni Informatsii, Moscow, USSR) Biofizika (ISSN 0006-3029), vol. 29, Sept.-Oct. 1984, p. 899-902. In Russian. refs

The structural characteristics of neural net activity are analyzed. Specific attention is given to nets which have oscillation periods greater than the total number of neurons. It is shown that those nets capable of learning can be taught to behave as oscillator nets. The connection between neural oscillator net activity and selfwave processes in topologically simple, excitable tissues is discussed in detail. I.H.

A85-23266

PROTEIN SYNTHESIS AND DNA REPLICATION IN LYMPHOCYTES IN AN IMMUNE RESPONSE [SINTEZ BELKOV I REPLIKATSIIA DNK V LIMFOTSITAKH PRI IMMUNNOM OTVETE]

A. I. NIKOLAEVA (Akademii Meditsinskikh Nauk SSSR, Nauchno-Issledovatel'skii Institut Epidemiologii i Mikrobiologii, Moscow, USSR) Uspekhi Sovremennoi Biologii (ISSN 0042-1324), vol. 98, Sept.-Oct. 1984, p. 193-205. In Russian. refs

A85-23267

PHAGOCYTOSIS - PHYSIOLOGICAL AND MOLECULAR ASPECTS [FAGOTSITOZ - FIZIOLOGICHESKIE I MOLEKULIARНЫE ASPEKTY]

V. M. ZEMSKOV (Ministerstvo Zdravookhraneniia SSSR, Institut Immunologii, Moscow, USSR) Uspekhi Sovremennoi Biologii (ISSN 0042-1324), vol. 98, Sept.-Oct. 1984, p. 219-234. In Russian. refs

The current status of research on phagocytosis is reviewed. Particular attention is given to the recognition of xenobiotics by means of a system of humoral molecules, i.e., opsonins and various phagocyte plasma-membrane receptors associated with opsonized or intact particles. Also considered are: molecular mechanisms for the absorption of particles; metabolic changes in phagocytes during their interaction with the particles; the energy basis of phagocytosis; and locomotor mechanisms of phagocytes, including chemotaxis and spontaneous migration. B.J.

A85-23268

SOME METHODOLOGICAL APPROACHES TO PREDICTING THE FUNCTIONAL STATE OF THE BODY ASSOCIATED WITH HAZARDOUS ENVIRONMENTAL FACTORS [O NEKOTORYKH METODICHESKIKH PODKHODAKH K PROGNOZIROVANIU NEBLAGOPRIATNYKH FAKTOROV SREDY]

E. M. SHPILEVSKII, V. K. LUGOVSKII, and L. A. IUSHKOVA (Minskii Meditsinskii Institut, Minsk, Belorussian SSR) Gigiena i Sanitariia (ISSN 0016-9900), Oct. 1984, p. 7-11. In Russian. refs

An integral mathematical index has been determined in order to quantitatively assess chemical toxicity. The index is based on laboratory measurements of animal membrane impairment following exposure to various toxic substances. A formula is given for calculating the index, and some representative exposure/response curves are derived. The need for wider application of mathematical modelling techniques to determine the permissible levels of toxic substances in the environment is also discussed. I.H.

51 LIFE SCIENCES (GENERAL)

A85-23269

HYGIENIC STANDARDS FOR ELECTROMAGNETIC RADIATION IN THE HOME [GIGIENICHESKOE NORMIROVANIE ELEKTROMAGNITNYKH IZLUCHENII V USLOVIAKH BYTA]
IU. D. DUMANSKII, N. G. NIKITINA, L. A. TOMASHEVSKAIA, and S. M. KOCHERGIN (Kievskii Nauchno-Issledovatel'skii Institut Obshchei i Kommunal'noi Gigieny, Kiev, Ukrainian SSR) *Gigiena i Sanitariia* (ISSN 0016-9900), Oct. 1984, p. 20-23. In Russian.

The results of a medico-biological experiment to evaluate the characteristics of electromagnetic radiation from microwave ovens and induction furnaces are discussed, in order to identify safe levels for electromagnetic radiation in the home. A number of biochemical, physiological, and immunological indices in white mongrel white rats were measured following exposure to electromagnetic field (EMF) microwaves at densities of 100-1000 microwatts per sq cm, and electron wave frequencies ranging from 20-22 kHz at 5-1 kV/m (electric component), and 40 A/m (magnetic component). On the basis of the experimental data, the following maximum allowable levels are proposed for household electromagnetic radiation: 10 microwatts per sq cm for microwaves; 0.5 kV/m for the electric component of the household EMF; and 4A/m for the magnetic component. I.H.

A85-23275

THE EFFECT OF AN IRON DEFICIENT DIET ON THE FORMATION OF BONE TISSUE [VLIJANIE RATSIONOV S DEFITSITOM ZHELEZA NA FORMIROVANIE KOSTNOI TKANI]
V. I. SMOLIAR (Nauchno-Issledovatel'skii Institut Gigieny Pitaniia, Kiev, Ukrainian SSR) *Voprosy Pitaniia* (ISSN 0042-8833), Sept.-Oct. 1984, p. 55-59. In Russian. refs

A85-23290

FATTY ACID METABOLISM IN THE MYOCARDIUM UNDER NORMAL CONDITIONS AND IN CARDIAC DISEASE (SURVEY) [METABOLIZM ZHIRNYKH KISLOT V MIOKARDE V NORME I PRI ISHEMII /OBZOR/]
I. F. MATIUSHIN, G. A. BOIARINOV, and IU. A. BOGDARIN (Gor'kovskii Meditsinskii Institut, Gorki, USSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 30, Sept.-Oct. 1984, p. 2-13. In Russian. refs

Medical data for the absorption and consumption of free and ester-bound fatty acids in the heart are discussed. Particular attention is given to: the preferential utilization of individual fatty acids from blood lipids; the dependence of fatty acid metabolism on the activity of the tricarboxylic acid cycle; and the interrelationship between the metabolisms of endogenous and exogenous fatty acids. Attention is also given to: the effects of hypoxia on fatty acid metabolism in the heart; the dietary aspects of fatty-acid accretion in the heart; the effect of fatty acid excesses on the functional state of the sarcoplasmic reticulum and mitochondrial membranes. Data for exogenous fatty acid turnover in heart tissues, and the conversion of exogenous fatty acids into endogenous fatty acids are presented. I.H.

A85-23291

CHANGES IN THE COMPOSITION OF MITOCHONDRIAL LIPIDS IN THE PRESENCE OF DINITROPHENOL UNDER HYPOXIC CONDITIONS [IZMENENIE LIPIDNOGO SOSTAVA MITOKHONDRII PRI GIPOKSII V PRISUSTVII RAZOBSHCHITELIA DINITROFENOLA]
G. V. DEKUTOVICH, A. V. KARGAPOLOV, M. I. PETUKHOV, A. F. KHODYREVA, and G. G. ARKHANGELSKAIA (Kalininskii Meditsinskii Institut, Kalinin, USSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 30, Sept.-Oct. 1984, p. 26-28. In Russian. refs

It is shown through a series of experiments that mitochondrial phospholipids are hydrolyzed under hypoxic conditions by a hypotonic solution of sucrose with dinitrophenol as an uncoupler. The most pronounced lipid destruction was observed in the phosphatidyl ethanolamine and cardiolipin components. Hydrolysis of the diacyl phospholipids was accompanied by an increase in the concentrations of content of the lyso-derivatives lysophosphatidyl ethanolamine and lysocardiolipin. Following the addition of

tetracaine hydrchloride, the content of the lyso-derivatives was diminished. It is suggested that the increased hydrolysis may be due to an increase in mitochondrial phospholipase activity under hypoxic conditions in the presence of dinitrophenol. I.H.

A85-23293

THE EFFECT OF DEFICIENT BLOOD SUPPLY IN THE HEART ON ATPASE SYSTEMS [VLIJANIE ISHEMII MIOKARDA NA ATFAZNYE SISTEMY]
V. V. SHKOLOVOI (Kalininskii Meditsinskii Institut, Kalinin, USSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 30, Sept.-Oct. 1984, p. 41-43. In Russian. refs

The preferential inhibition of Mg(++)-dependent ATPase activity relative to Ca(++) ATPase activity in homogeneous mitochondria and sarcoplasmic reticulum tissue from rabbits and rats are investigated *in vitro*. It is shown that the specific alterations in ATPase activity observed in various organelles appear to reflect the dissimilar rates of partial inhibition in ATPase complexes, and do not occur due to alterations in electrolyte microcirculation. The inhibition of ATPase activity in cases of blood supply deficiency may be responsible for the deterioration of myocardial function.

I.H.

A85-23294

EFFECT OF METHYLMETHACRYLATE AND ACRYLAMIDE ON THE MICROSOMAL OXIDATION SYSTEM IN THE RAT LIVER [VZAIMODEISTVIE METILMETAKRILATA I AKRILAMIDA S SISTEMOI MIKROSAMAL'NOGO OKISLENIIA PECHENI KRYA]
IU. V. KOTLOVSKII, A. IU. GRISHANOVA, and V. V. IVANOV (Krasnoiarskii Meditsinskii Institut, Krasnoyarsk; Akademiiia Meditsinskikh Nauk SSSR, Institut Klinicheskoi i Ksperimental'noi Meditsiny, Novosibirsk, USSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 30, Sept.-Oct. 1984, p. 44-49. In Russian. refs

A85-23295

THE EFFECT OF ISATIN AND ITS DERIVATIVES ON CERTAIN INDICES OF CARBOHYDRATE METABOLISM [VLIJANIE IZATINA I EGO PROIZVODNYKH NA NEKOTORYE POKAZATELI UGLEVODNOGO OBMENA]
V. N. GARALENE and L. I. MAZHILIS (Nauchno-Issledovatel'skii Institut Fiziologii i Patologii Serdechno-Sosudistoi Sistemy, Kaunas, Lithuanian SSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 30, Sept.-Oct. 1984, p. 56-59. In Russian. refs

The effects of isatin and three of its derivatives (5-bromisatin, 5-butylisatin and a compound of both 5-bromisatin and 5-butylisatin) on the lactate, pyruvate and glycogen content of various rat tissues has been investigated. It is found that all of the substances (except 5-butylisatin) decreased the content of lactic acid with a simultaneous increase of glycogen content in liver tissue. Pyruvate content was increased significantly in the presence of 5-bromisatin and 5-butylisatin. In hypoxic conditions, a distinct increase was observed in the lactate and pyruvate contents of the tissues following the administration of 5-bromisatin. The substances were also found to be useful in controlling the consumption of glycogen in liver tissue and skeletal muscles due to hypoxia. I.H.

A85-23297

EFFECT OF LETHAL AND SUPERLETHAL DOSES OF GAMMA RADIATION ON THE ACTIVITY OF LYSOSOMAL ENZYMES IN RADIO-SENSITIVE AND RADIO-RESISTANT RAT TISSUES [VLIJANIE LETAL'NYKH I SVERKHLETAL'NYKH DOZ GAMMA-OBLUCHENIIA NA AKTIVNOST' LIZOSOMNYKH FERMENTOV V RADIOCHUVSTVITEL'NOI I RADIOREZISTENTNOI TKANIACH KRYA]
G. I. ALEKSEEV, B. F. KOROVKIN, N. P. MIKHALEVA, and G. M. FEDOTOV (Voenno-Meditsinskaiia Akademiiia, Leningrad, USSR) *Voprosy Meditsinskoi Khimii* (ISSN 0042-8809), vol. 30, Sept.-Oct. 1984, p. 95-98. In Russian. refs

A85-23298

STATUS OF THE KALLIKREIN-KININ SYSTEM IN BLOOD FROM THE CARDIAC VENTRICLES IN THE DEVELOPMENT DYNAMICS OF SPONTANEOUS HYPERTENSION IN RATS [SOSTOIANIE KALLIKREIN-KININOVOI SISTEMY KROVI IZ ZHELUDOCHKOV SERDTSA V DINAMIKE RAZVITIIA SPONTANNOI GIPERTENZII U KRYS]

V. V. KARPITSKII (Izdatel'stvo Nauchno-Issledovatel'skii Institut Fizicheskikh Metodov Lecheniya i Meditsinskoi Klimatologii, Yalta, Ukrainian SSR) Voprosy Meditsinskoi Khimii (ISSN 0042-8809), vol. 30, Sept.-Oct. 1984, p. 110-113. In Russian. refs

A85-23301

THE MORPHOLOGICAL BASIS OF A 'MINIMIZATION FUNCTION' FOR THE NEPHRON EPITHELIUM DURING UNIFORM HYPERTERMIA [STRUKTURNYE OSNOVY 'MINIMIZATSII FUNKTSII' PROKSIMAL'NYKH EPITELIOTSITOV NEFRONOV PRI ODNOKRATNOM OSTROM PEREGREVANII ORGANIZMA]

O. Z. MKRTCHAN (Tiumenskii Gosudarstvennyi Universitet, Tyumen, USSR) Tzitologiya i Genetika (ISSN 0041-4883), vol. 18, Sept.-Oct. 1984, p. 323-326. In Russian. refs

The regularity of structural changes in the epithelium of rat nephrons has been investigated under extreme temporary hyperthermia at 44.5-45°C for a period of sixty minutes. A microscopic analysis of nephron tissue showed that the size of renal corpuscles tended to diminish in response to the high temperatures. Damage was observed mainly in the epithelium of the proximal parts of the nephrons, and manifested in disturbances in the reabsorption function of the cells. It is suggested that the lowered epithelium reabsorptivity contributed to the survival of the cells following heating and to subsequent reparative processes.

I.H.

A85-23302

THE EFFECT OF MAGNETIC FIELDS ON SOMATIC CELL DIVISION IN PLANTS [VLIJANIE MAGNITNYKH POLEI NA DELENIE SOMATICHESKIKH KLETOK RASTENII]

L. V. CHASTOKOLENKO (Tomskii Gosudarstvennyi Universitet, Tomsk, USSR) Tzitologiya i Genetika (ISSN 0041-4883), vol. 18, Sept.-Oct. 1984, p. 339-343. In Russian. refs

A85-23303

REDUNDANCY AS A PRINCIPLE OF THE PROGRAMMING ACTIVITY OF THE BRAIN [IZBYTOCHNOST' KAK PRINTSIP PROGRAMMIRUIUSHCHEI DEIATEL'NOSTI GOLOVNOGO MOZGA]

R. I. KRUGLIKOV Voprosy Filosofii (ISSN 0042-8744), no. 9, 1984, p. 86-94. In Russian. refs

A85-23305

ACTIVATION AND LOCALIZATION OF TRANSPORT ATPASE IN CELLS OF PEA-SEEDLING ROOTS IN HYPOGRAVITY CONDITIONS [AKTIVNIST' I LOKALIZATSIIA TRANSPORTNIKH ADENOZINTRIFOSFATAZ U KLITINAKH KORENIV

PROROSTKIV GOROKHU V UMOVAKH GIPOGRAVITATSII]

T. O. PALLADINA, E. L. KORDIUM, and N. O. BILIAVSKA (Akademii Nauk Ukrains'koi RSR, Institut Fiziologii Roslin i Institut Botaniki, Kiev, Ukrainian SSR) Ukrains'kii Botanichniy Zhurnal (ISSN 0372-4123), vol. 41, no. 5, 1984, p. 54-57. In Ukrainian. refs

Experiments were performed on five-day pea seedlings grown under horizontal clinostating at 2 rev/min. In plasma membrane preparations isolated from the roots, the protein content and the activity of the $Ca(2+)$ -dependent ATPase decreased significantly compared with the control, and the activity of the $Mg(2+)$ -dependent $K(+)$ -stimulated ATPase increased to some extent. Data of cytochemical and biochemical analyses are found to correlate on the whole. It is suggested that hypogravity conditions, inducing changes in the plasmalemma structure, may have a significant effect on the system of active $Ca(2+)$ transport.

B.J.

A85-23307

THE CONNECTION BETWEEN THE PARAMETERS OF SODIUM AND POTASSIUM DISTRIBUTION AND THE CONTRACTILE PROPERTIES OF MUSCLES [O VZAIMOSVIAZI MEZHDU PARAMETRAMI RASPREDELENIIA IONOV NATRIIA I KALIIA I SOKRATITEL'NYMI SVOISTVAMI MYSHTS]

V. P. NESTEROV (Akademii Nauk SSSR, Institut Evoliutsionnoi Fiziologii i Biokhimii, Leningrad, USSR) Zhurnal Evoliutsionnoi Biokhimii i Fiziologii (ISSN 0044-4529), vol. 20, Sept.-Oct. 1984, p. 453-459. In Russian. refs

A85-23308

FREE AMINO ACIDS IN THE BRAINS OF SOME VERTEBRATES [SVOBODNYE AMINOKISLOTY V GALOVNOM MOZGU NEKOTORYKH POZVONOCHNYKH]

A. E. PASHCHENKO and I. M. TURIANITSA (Uzhgorodskii Gosudarstvennyi Universitet, Uzhgorod, Ukrainian SSR) Zhurnal Evoliutsionnoi Biokhimii i Fiziologii (ISSN 0044-4529), vol. 20, Sept.-Oct. 1984, p. 474-477. In Russian. refs

Measurements of the content of free amino acids in the white and gray matter of normal human subjects were compared with measurements from the brains of several vertebrate animals. The animals included a pike, a hare, a frog, and a pheasant. Differences in the distribution of free amino acids were identified, and some implications are discussed. It is found that the concentrations of free histidine, arginine, ornithine, serine, and threonine were higher in man than in the pheasant or the pike, but lower than the concentrations in brain tissue samples from the hare and the frog. Concentrations of histidine and arginine in the human brain matter were higher than in any of the animal tissues. I.H.

A85-23310

AN ELECTRON MICROSCOPIC AND CYTOCHEMICAL INVESTIGATION OF BLOOD LYMPHOCYTE SUBPOPULATIONS IN ASSOCIATION WITH CORTICOSTEROID DEFICIENCY [ELEKTRONNO-MIKROSKOPICHESKIE I TSITOKHIMICHESKOE ISSLEDOVANIE SUBPOPULIATSII LIMFOTSITOV KROVI PRI NEDOSTATKE KORTIKOSTEROIDOV]

K. P. ZAK, R. S. FILATOVA, V. S. SHLIAKHOVENKA, M. A. GRUZOV, B. M. KHOMENKO, V. I. KRAVCHENKO, L. N. RUDENKO, and I. M. STARIKOVSKAIA (Ministerstvo Zdravookhraneniia Ukrainskoi SSR, Kievskii Nauchno-Issledovatel'skii Institut Endokrinologii i Obmena Veshchestv, Kiev, Ukrainian SSR) Problemy Endokrinologii, vol. 30, Sept.-Oct. 1984, p. 78-82. In Russian. refs

A85-23313

EFFECT OF DECIMETER WAVES ON THE RELATIVE CONTENT OF T-LYMPHOCYTES IN THE LYMPHOID ORGANS [DEISTVIE DETSIMETROVYKH VOLN NA OTNOSITEL'NOE SODERZHANIE T-LIMFOTSITOV V LIMFOIDNYKH ORGANAKH]

V. M. EVSTROPOV and R. A. ZULKARNEEV (Kirgizskii Nauchno-Issledovatel'skii Institut Kurortologii i Fizioterapii, Kirgiz SSR) Zdravookhranenie Kirgizii, Sept.-Oct. 1984, p. 29-33. In Russian.

The effect of decimeter waves on the level of T-lymphocytes in the lymphoid organs was studied experimentally in guinea pigs in the case of irradiation of the neck region. It is shown that the decimeter waves lead to the removal of T-lymphocytes from the thymus and spleen, and increase the relative content of T-cells in the lymph nodes. It is also shown that the main subpopulation which participates in these processes is the theophylline-sensitive T-lymphocytes. B.J.

A85-23725

THE PHARMACOLOGICAL CORRECTION OF FATIGUE [FARMAKOLOGICHESKAIA KORREKTSIIA UTOLENIIA]

IU. G. BOBKOV, V. M. VINOGRADOV, V. F. KATKOV, S. S. LOSEV, and A. V. SMIRNOV Moscow, Izdatel'stvo Meditsina, 1984, 208 p. In Russian. refs

Experimental approaches to the evaluation of physical work capacity and fatigue are discussed, with emphasis on the use of pharmaceutical preparations as stimulants. A biochemical analysis

51 LIFE SCIENCES (GENERAL)

of a new group of stimulant drugs (actoprotectors) is presented, and the results are compared with published data for psychostimulant drugs. The relative effects of actoprotectors and psychostimulants on the content of energy metabolites during the performance of physical work are also compared. I.H.

A85-23870* California Univ., Berkeley.

EVOLUTIONARY CONSTRAINTS AND THE NEUTRAL THEORY
T. H. JUKES (California, University, Berkeley, CA) and M. KIMURA (National Institute of Genetics, Misima, Shizuoka, Japan) *Journal of Molecular Evolution* (ISSN 0022-2844), vol. 21, no. 1, 1984, p. 90-92. refs
(Contract NGR-05-003-460)

The neutral theory of molecular evolution postulates that nucleotide substitutions inherently take place in DNA as a result of point mutations followed by random genetic drift. In the absence of selective constraints, the substitution rate reaches the maximum value set by the mutation rate. The rate in globin pseudogenes is about 5×10^{-9} substitutions per site per year in mammals. Rates slower than this indicate the presence of constraints imposed by negative (natural) selection, which rejects and discards deleterious mutations.

Author

A85-24026

CHANGE IN ORNITHINE CARBAMOYLTRANSFERASE ACTIVITY IN RATS AFTER X-RAY IRRADIATION AND THE ADMINISTRATION OF A VITAMIN-COENZYME COMPLEX
[IZMENENIE AKTIVNOSTI ORNITINKARBAMOILTRANSFERAZY U KRYS POSLE RENTGENOVSKOGO OBLUCHENIIA I VVEDENIIA VITAMINOKOFERMENTNOGO KOMPLEKSA]
I. V. SAVITSKII and G. A. KARPOVICH (Odesskii Meditsinskii Institut, Odessa, Ukrainian SSR) *Radiobiologija* (ISSN 0033-8192), vol. 24, Nov.-Dec. 1984, p. 826-828. In Russian. refs

A85-24027

EFFECT OF AN ELEVATED LEVEL OF NATURAL RADIOACTIVITY ON GLYCOGEN CONTENT IN PERIPHERAL-BLOOD LEUKOCYTES OF MICROTUS OECONOMUS PALL [VLIANIE POVYSHENNOGO UROVNA ESTESTVENNOI RADIOAKTIVNOSTI NA SODERZHANIE GLIKOGENA V LEIKOTOSITAKH PERIFERICHESKOI KROVI POLEVOV-EKONOMOK /MICROTUS OECONOMUS PALL/]
L. D. MATERII and K. I. MASLOVA (Akademii Nauk SSSR, Institut Biologii, Siktivkar, USSR) *Radiobiologija* (ISSN 0033-8192), vol. 24, Nov.-Dec. 1984, p. 828-831. In Russian. refs

A85-24193

ENERGY TRANSFER IN PLANTS IN WEIGHTLESSNESS [ENERGOOBMEN RASTENII NEVESOMOSTI]

M. G. TAIRBEKOV and A. V. DEVIATKO (Ministerstvo Zdravookhraneniia SSSR, Institut Mediko-Biologicheskikh Problem, Moscow, USSR) *Akademii Nauk SSSR, Doklady* (ISSN 0002-3264), vol. 280, no. 2, 1985, p. 509-512. In Russian. refs

The plant energy-transfer experiment aboard the Cosmos-1514 biosatellite in December 1983 is considered. Heat release from corn sprouts was measured by a biocalorimeter operating in the 0-100 mW range. Results indicate that weightlessness has no effect on the intensity of energy transfer in sprouting seeds. The design of the biocalorimeter is described in some detail. B.J.

A85-24499* Louisville Univ., Ky.

CONTRADICTORY RESULTS IN INTERFERON RESEARCH

G. SONNENFELD (Louisville, University, Louisville, KY) *Survey of Immunologic Research* (ISSN 0252-9564), vol. 3, 1984, p. 198-201. Research supported by the Kentucky Tobacco and Health Research Institute. refs
(Contract NCC-213)

Several reports on immunologically related interferon research, both in the areas of basic science and clinical research, are briefly reviewed, and it is noted that in many cases the results obtained are contradictory. It is argued, however, that the contradictory results are not surprising since interferon is a biological response

modifier and has been known to produce opposite results even when the same interferon preparation is used. It is emphasized that dosage, timing, route, and other experimental conditions are essential factors in planning immunological studies with interferon. Careful planning of future experiments with interferon should be required to prevent the possible generation of effects that are opposite to those expected.

V.L.

A85-24500* University of Western Ontario, London.

TYROSINE ADMINISTRATION ENHANCES DOPAMINE SYNTHESIS AND RELEASE IN LIGHT-ACTIVATED RAT RETINA

C. J. GIBSON, C. J. WATKINS (Western Ontario, University, London, Canada; MIT, Cambridge, MA), and R. J. WURTMAN (MIT, Cambridge, MA) *Journal of Neural Transmission* (ISSN 0300-9564), vol. 56, 1983, p. 153-160. refs
(Contract NIH-AM-14228; NGR-22-009-627)

Exposure of dark-adapted albino rats to light (350 lux) significantly elevated retinal levels of the dopamine metabolite dihydroxyphenyl acetic acid during the next hour; their return to a dark environment caused dihydroxyphenyl acetic acid levels to fall. Retinal dopamine levels were increased slightly by light exposure, suggesting that the increase in dihydroxyphenyl acetic acid reflected accelerated dopamine synthesis. Administration of tyrosine (100 mg/kg, i.p.) further elevated retinal dihydroxyphenyl acetic acid among light-exposed animals, but failed to affect dopamine release among animals in the dark. These observations show that a physiological stimulus - light exposure - can cause catecholaminergic neurons to become tyrosine-dependent; they also suggest that food consumption may affect neurotransmitter release within the retina.

Author

A85-24650

THE PHOTOSYNTHETIC APPARATUS OF BACTERIA AS A CONVERTER OF THE ENERGY OF LIGHT INTO ELECTRICAL ENERGY [FOTOSINTETICHESKII APPARAT BAKTERII KAK PREOBRAZOVATEL' SVETOVOI ENERGII V ELEKTRICHESKUIU]

V. D. SAMUILOV *Itogi Nauki i Tekhniki, Seriia Biofizika* (ISSN 0208-2314), vol. 14, 1983, p. 4-128. In Russian. refs

The current status of research on photoconversion in primary acts of bacterial photosynthesis is reviewed. Data are presented on: the biogenesis and composition of the photosynthetic membranes of bacteria; macromolecular pigment-protein complexes; the quantum yield of the photooxidation of chlorophyll reaction centers; and the mechanism of primary charge separation. Experimental data show that the photosynthetic apparatus acts as a photoelectric converter. Particular attention is given to: mechanisms for the generation of membrane potential during cyclic and noncyclic electron transport; the electrochromic effects of carotenoids and bacteriochlorophyll; and the role of membrane potential in supplying energy for cell-metabolism processes. It is concluded that the electrical energy which is obtained from light is used in performing metabolic work.

B.J.

A85-25043* California Univ., Santa Barbara.

QUANTUM NOISE AND THE THRESHOLD OF HEARING

W. BIALEK (California, University, Santa Barbara; California, University, Berkeley, CA) and A. SCHWEITZER (California, University, San Francisco, CA) *Physical Review Letters* (ISSN 0031-9007), vol. 54, Feb. 18, 1985, p. 725-728. Research supported by the Coleman Memorial Fund and NASA. refs
(Contract NIH-HS-11804; NSF PCM-78-22245; NSF PHY-77-27084; DE-AC03-76SF-00098)

It is argued that the sensitivity of the ear reaches a limit imposed by the uncertainty principle. This is possible only if the receptor cell holds the detector elements in a special nonequilibrium state which has the same noise characteristics as a ground ($T = 0$ K) state. To accomplish this 'active cooling' the molecular dynamics of the system must maintain quantum mechanical coherence over the time scale of the measurement.

Author

A85-25617

CHANGE IN THE RESPONSE OF THE HEART TO POSTHYPOTIC REOXYGENATION AFTER INJECTION OF SUPEROXIDE DISMUTASE AND ITS INHIBITOR [IZMENENIE REAKTSII SERDTSA NA POSTGIPOKSICHESKUIU REOKSIGENATSIU PRI VVEDENII SUPEROKSIDDISMUTAZY I EE INGIBITORA]

V. I. MILCHAKOV, A. M. GERASIMOV, IU. B. KOLOSKOV, E. A. DEMUROV, T. G. SMUROVA, and S. N. EFUNI (Akademiiia Meditsinskikh Nauk SSSR, Vsesoiuznyi Nauchnyi Tsentr Khirurgii; Tsentral'nyi Nauchno-Issledovatel'skii Institut Travmatologii i Ortopedii, Moscow, USSR) Akademiiia Nauk SSSR, Doklady (ISSN 0002-3264), vol. 280, no. 3, 1984, p. 766-768. In Russian. refs

A85-25644

GENERAL FEATURES OF SENSORY PROCESSES UNDER THE EFFECTS OF EXTREME STIMULI [OBOSHCHIE ZAKONOMERNOSTI SENSORYKH PROTSESSOV V USLOVIIAKH VOZDEISTVIIA EKSTREMAL'NYKH RAZDRAZHITELEI]

V. I. MEDVEDEV, T. V. GIBADULIN, V. N. GOLUBEV, V. V. KOLBANOV, A. G. KUZOVKOV, and V. I. SHOSTAK (Voenno-Meditsinskaia Akademiiia, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 70, Dec. 1984, p. 1600-1605. In Russian. refs

It is shown that a series of changes takes place in the sensory system in response to unusual or extreme stimuli. The changes can be initiated directly by receptor processes or indirectly by interaction with the central nervous system. Some general laws governing changes of functional state in afferent systems are identified which conform to biophysical and neurophysical processes. It is recommended that future investigations of the functional states of sensory systems in extreme conditions take into account the effects of sensory fatigue. I.H.

A85-25647

PROTEIN METABOLISM IN THE MUSCLES FOLLOWING MUSCULAR WORK [BELKOVIYI OBMEN V MYSHTSAKH POSLE IKH RABOTY]

A. A. VIRU, E. V. VARRIK, V. E. EEPIK, and A. IA. PEKHME (Tartuskii Gosudarstvennyi Universitet, Tartu, Estonian SSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 70, Dec. 1984, p. 1624-1628. In Russian. refs

It is shown that the levels of tyrosine and 3-methylhistidine in protein samples from rat skeletal muscles were significantly elevated 2-24 hours after swimming exercises of 20 hours duration. A significant increase in 3-methylhistidine excretion was observed on the second day of the recovery period. On the basis of the observed combination of metabolic changes after the swimming exercises, it is suggested that the processes of protein synthesis and disintegration occur simultaneously in muscle tissue following physical activity. The increase in the level of 3-methylhistidine during the recovery period was associated with the restoration of the molecular composition of proteins in the actomyosin complex. An additional increase in the level of 3-methylhistidine in the intestine was only temporary and did not contribute to the observed delay in the excretion of intestinal amino acids. I.H.

A85-25701

EFFECT OF CUTANEOUS DENERVATION OF FACE AND TRUNK ON THERMOREGULATORY RESPONSES TO COLD IN RATS

M. E. HEATH (California, University, La Jolla, CA) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, Feb. 1985, p. 376-383. refs

(Contract NIH-F32-NS-06516; NIH-R01-HL-29006)

A85-25705

EFFECTS OF EXERCISE TRAINING ON CORONARY TRANSPORT CAPACITY

M. H. LAUGHLIN (Oral Roberts University, Tulsa, OK) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, Feb. 1985, p. 468-476. Research supported by Oral Roberts University. refs (Contract NIH-HL-26963; NIH-AM-25472)

Coronary transport capacity was measured in eight exercise-trained dogs in order to test the hypothesis of Morris et al. (1953) that increases in coronary vascularity and capillary density due to exercise are associated with increased transport capacity. Measurements of base line and peak coronary blood flow and permeability-surface area product (PS) in the exercise-trained dogs were compared to measurements of a group of sedentary dogs, and the results are discussed. The anterior descending branch of the left coronary artery was cannulated and pump-perfused under constant pressure of about 100 Torr, and aortic, central venous, and coronary blood flow rates were monitored. No differences were found between the control and trained dogs for either at-rest coronary blood flow rates or PS. During maximal dilation with adenosine, the trained dogs showed significantly lower perfusion pressures with constant flow. On the basis of the experimental data it is concluded that exercise training increased coronary transport capacity by as much as 26 percent, and capillary diffusion capacity was increased 82 percent, in comparison with the untrained animals. I.H.

A85-25706

INFLUENCE OF G-SUIT ABDOMINAL BLADDER INFLATION ON GAS EXCHANGE DURING +GZ STRESS

H. I. MODELL, P. BEEMAN, and J. MENDENHALL (Virginia Mason Research Center; Washington, University, Seattle, WA) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, Feb. 1985, p. 506-513. refs

(Contract F49620-78-C-0058; F49620-81-C-0055)

In order to examine the time course of blood gas changes doing constant exposure to +Gz stress, seven adult dogs were exposed to centrifugal stresses of up to +5 Gz for 60 s, with and without an inflated abdominal bladder G-suit. Arterial and mixed venous blood were sampled for blood gas analysis during the first and last 20 seconds of exposure, and at 3 minutes following exposure. The analysis showed little change in blood gas status at +3 Gz, regardless of G-suit status. When the G-suit was inflated, arterial PO₂ fell by 14.7 Torr during the first 20 seconds at +4 Gz, and continued to fall during the next 40 seconds. Arterial PO₂ remained 5-10 Torr below control values 3 min after exposure. A second series of experiments was carried out to determine the effect of acceleration on blood gas exchange. Blood gas status was assessed in five dogs in the last 20 second of two 60-second exposures to 0 Gz. No significant differences were found between the initial and repeated exposures to 0 Gz. On the basis of the experimental data, it is concluded that G-suit abdominal bladder inflation increased venous admixture during exposure to Gz stress. I.H.

A85-25707

ANGIOTENSIN II. - INDUCED HYPOTHERMIA IN RATS

K. M. WILSON and M. J. FREGLY (Florida, University, Gainesville, FL) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, Feb. 1985, p. 532-543. refs

(Contract NIH-AM-31837-02)

The effect of peripherally administered angiotensin (ANG) II on body temperature was studied in female rats. ANG II was administered alone and in combination with cholinergic and adrenergic blockers in doses ranging from 10 to 200 micrograms/kg. Temperatures were measured by copper constant thermocouples in the colon, and at the base of the tail of each rat. It is shown that administration of ANG II decreased colonic temperature and increased skin temperature. Temperature response to administration of ANG II in combination with cholinergic and adrenergic blockers is described. On the basis of the experimental results, it is suggested that the hyperthermic response to ANG II may be mediated through a central cholinergic pathway.

51 LIFE SCIENCES (GENERAL)

and is possibly influenced by an adrenergic component. The inability of both adrenergic and cholinergic blockers to affect vasodilatory response in the tail showed that the mechanism of heat production can be blocked independently of the mechanisms of heat loss.

I.H.

A85-25708

EPINEPHRINE IS UNESSENTIAL FOR STIMULATION OF LIVER GLYCOGENOLYSIS DURING EXERCISE

K. I. CARLSON, J. C. MARKER, D. A. ARNALL, M. L. TERRY, H. T. YANG, L. G. LINDSAY, M. E. BRACKEN, and W. W. WINDER (Brigham Young University, Provo, UT) *Journal of Applied Physiology* (ISSN 0161-7567), vol. 58, Feb. 1985, p. 544-548. refs

(Contract NIH-AM-32261)

To determine the role of adrenal medullary hormones in controlling the rate of liver glycogenolysis during exercise, adrenomedullated (ADM) and sham-operated (SO) rats were run on a rodent treadmill at 21 m/min up a 15 percent grade for 0, 30, or 60 min. Rats were anesthetized by intravenous injection of pentobarbital sodium, and liver, muscle, and blood were collected and frozen. Liver glycogen decreased at similar rates in ADM and SO rats. Hepatic adenosine 3', 5'-cyclic monophosphate (cAMP), plasma glucagon, and plasma free fatty acids increased to the same extent in both ADM and SO rats. The adrenomedullation caused a reduction in glycogenolysis in the fast-twitch white region of the quadriceps, soleus, and lateral gastrocnemius during exercise. The normal exercise-induced increase in blood glucose and lactate and the decline in plasma insulin were not observed in the demedullated rats. During submaximal exercise the principal targets for epinephrine released from the adrenal medulla appear to be pancreatic beta-cells and skeletal muscle and not the liver.

Author

A85-25709

VENTILATION AND ACID-BASE BALANCE IN AWAKE DOGS EXPOSED TO HEAT AND CO₂

M. MASKREY (Tasmania, University, Hobart, Australia; Queen's University, Kingston, Ontario, Canada) and D. B. JENNINGS (Queen's University, Kingston, Ontario, Canada) *Journal of Applied Physiology* (ISSN 0161-7567), vol. 58, Feb. 1985, p. 549-557. Research supported by the Medical Research Council of Canada. refs

A85-25822

MUSCLE CONTRACTION AND FREE ENERGY TRANSDUCTION IN BIOLOGICAL SYSTEMS

E. EISENBERG (National Institutes of Health, National Heart, Lung, and Blood Institute, Bethesda, MD) and T. L. HILL (National Institutes of Health, National Institute of Arthritis, Diabetes, Digestive and Kidney Diseases, Bethesda, MD) *Science* (ISSN 0036-8075), vol. 227, March 1, 1985, p. 999-1006. refs

The development of cross-bridge models of muscle contraction from biochemical studies on the actomyosin ATPase activity is reviewed. It is shown how a current view of crossbridge action is similar to the mechanism of other ATPase systems, such as active transport, and therefore illustrates the basic properties of ATP-driven free energy transduction.

C.D.

A85-25832

SUSPENDED ANIMATION FOR SPACE FLIGHT

J. HANDS (British Interplanetary Society, Journal (Interstellar Studies) (ISSN 0007-084X), vol. 38, March 1985, p. 139-142. refs

The status of current medical research concerned with hyperthermia and hibernation is discussed, and some applications in the field of suspended animation for long interstellar spaceflights are identified. It is suggested that a concerted research effort in the fields of hyperthermia and hibernation would have a reasonable chance of demonstrating the feasibility initiating hibernation in the 21st century.

I.H.

A85-26251

REDOX PROCESSES IN THE RAT MYOCARDIUM UNDER ACUTE HYPOXIA [OKISLITEL'NO-VOSSTANOVITEL'NYE PROTSESSY V MIOKARDE KRYS PRI OSTROI GIPOKSI]

G. V. DONCHENKO, IU. V. KHMELEVSKII, I. V. KUZMENKO, A. I. KORNITSKAIA, N. B. KAKHNOVER, O. IA. BARYK, A. A. SVISHCHUK, and V. P. MAKOVETSKII (Akademii Nauk Ukrainskoi SSR, Institut Biokhimii i Institut Organicheskoi Khimii; Kievskii Meditsinskii Institut, Kiev, Ukrainian SSR) *Fiziologicheskii Zhurnal* (Kiev) (ISSN 0201-8489), vol. 30, Mar.-Apr. 1984, p. 180-185. In Russian. refs

Changes in redox processes in rat myocardial tissue in response to high altitude hypoxia are investigated. Among the specific processes studied are: changes in vitamin E and ubiquinone content in the myocardium; changes in the activity of ubiquinone-dependent enzyme systems; glutathione peroxidase, and changes in glutathione reductase activity. The content of SH-groups and the ATPase level in myocardial mitochondria were determined for an altitude of 11,000 m above sea level. The possible applications of alpha-tocopherol and its derivatives to protect against myocardial hypoxia are evaluated. It is shown that disturbances in bioenergetic processes are one of the leading mechanisms for the development of myocardial hypoxia. Vitamin E is found to increase ubiquinone and alpha-tocopherol levels and restore the function of the NADH-ubiquinone-reductase system in myocardial mitochondria.

I.H.

A85-26252

SPECIFIC DIFFERENCES AND SEASONAL FLUCTUATIONS IN BLOOD SERUM ENZYME ACTIVITY IN EXPERIMENTAL ANIMALS [VIDOVYE RAZLICHIIA I SEZONNYE KOLEBANIIA FERMENTATIVNOI AKTIVNOSTI SYVOROTKI KROVI U EKSPERIMENTAL'NYKH ZHIVOTNYKH]

N. I. LARICHEVA, N. K. KHARCHENKO, and M. S. VOLOSHINA (Kievskii Institut Gematologii i Perelivaniia Krovi, Kiev, Ukrainian SSR) *Fiziologicheskii Zhurnal* (Kiev) (ISSN 0201-8489), vol. 30, Mar.-Apr. 1984, p. 191-194. In Russian. refs

The activity of alanine aminotransferase, aspartate aminotransferase, and alkaline phosphatase in the blood serum of test animals was investigated experimentally. The experimental animals included mongrel dogs, rabbits, and white rats. Measurements of enzyme activity were made throughout the course of the four seasons. Species-related differences and seasonal fluctuations in enzyme activity were found. It is shown that the data may be used as statistical indices of the normal physiological state of the animals. The data are given in a series of tables.

I.H.

A85-26253

CHANGES IN REDOX PROCESSES IN RATS WITH ANEMIA DUE TO ALKYLATING PREPARATIONS IN ALPINE CLIMATIC CONDITIONS [IZMENENIE OKISLITEL'NO-VOSSTANOVITEL'NYKH PROTSESSOV U KRYS S ANEMIIEI, VYZVANNOI ALKILIRUIUSHCHIMI PREPARATAMI, V USLOVIIAKH GORNOGO KLIMATA]

A. N. KRASIU (Akademii Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) *Fiziologicheskii Zhurnal* (Kiev) (ISSN 0201-8489), vol. 30, Mar.-Apr. 1984, p. 222-226. In Russian. refs

A85-26254

THE EFFECT OF LONG-TERM STRESS ON THE HYPOPHYSAL-ADRENAL-GONAD SYSTEMS IN RABBITS OF VARIOUS AGES [VLIJANIE DLITEL'NOGO STRESSEA NA SYSTEMU GIPOFIZ-NADPOCHECHNIKI-GONADY U KROLIKOV RAZNOGO VOZRASTA]

B. A. VARTAPETOV, L. A. BONDARENKO, and G. M. TRANDOFILOVA (Khar'kovskii Institut Endokrinologii i Khimii Gormonov, Kharkov, Ukrainian SSR) *Fiziologicheskii Zhurnal* (Kiev) (ISSN 0201-8489), vol. 30, Mar.-Apr. 1984, p. 243-245. In Russian. refs

The effect of long-term emotional stress on testicular and gonadal androgen secretion in rabbits of various ages has been

investigated. Stress was induced by daily immobilization for a period of one hour and electrical stimulation at a frequency of 100 Hz for one millisecond. The strength of the electrical current was 3-5 mA. Gonad and testicular androgen activity were determined by measurement of testosterone levels in the blood. It is shown that the long-term stress impaired androgen function in the gonads of adult rabbits, and led to obstructions in the sexual development of young animals. The complete experimental results are given in a table.

I.H.

A85-26255

METHODOLOGICAL ASPECTS OF THE PROBLEM OF NEUROHUMORAL REGULATION AND THEIR IMPLICATIONS FOR THE COGNITION OF PAIN MECHANISMS [METODOLOGICHESKIE ASPEKTY PROBLEMY NEIROGUMORAL'NOI REGULIATSII I IKH ZNACHENIE DLA POZNANIIA MEKHANIZMOV BOLI]

B. A. ROITRUB, IU. P. LIMANSKII, R. S. ZLATIN, and V. N. ILIN (Akademiiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol. 30, July-Aug. 1984, p. 385-393. In Russian. refs

The principal methodological problems of the study of neurophysiological and neurochemical mechanisms of perception and nociceptive information processing in humans are discussed. Particular attention is given to the problems of neurochemical coding; specific and nonspecific interactions between active substances and excitable membranes; and the reliability of physiological functions in general. It is recommended that quantitative characterizations of the functional state of the neurohumoral system take into account the principles of the study of mediators. It is suggested that the nociceptive and antinociceptive humoral codes of an organism are formed during pain reactions, and that antinociceptive codes are formed in analgesic states.

I.H.

A85-26257

AN INVESTIGATION OF THE ISOVOLUMIC INDICES OF MYOCARDIAL CONTRACTILITY IN RESPONSE TO DIRECTED CHANGES IN HEART FUNCTION [ISSLEDOVANIE IZOVOLUMICHESKIKH INDEKSOV SOKRATIMOSTI MIOKARDA PRI NAPRAVLENNYKH IZMENENIIAKH FUNKTSII SERDTSA]

L. A. GRABOVSKII, IU. P. BIDZILIA, and A. A. PETROV (Akademiiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol. 30, July-Aug. 1984, p. 416-425. In Russian. refs

The informational content of a series of isovolumic indices of the myocardium was determined in experiments with narcotized dogs. A correlation was found between directed variations in systolic pressure in the left auricle, and variation in intraventricular pressure. The interrelationship between Frank-Starling mechanisms and inotropic mechanisms in various heart reactions is discussed. It is shown that the method of directed variations can be used to identify specific treatment regimes for different types of cardiovascular disease.

I.H.

A85-26258

CHANGES IN CENTRAL HEMODYNAMIC PARAMETERS UNDER THE INFLUENCE OF VOLUME LOADING IN A HEALTHY STATE, AND DURING EXPERIMENTAL MYOCARDIAL INFARCTION [IZMENENIE POKAZATELEI TSENTRAL'NOI GEMODINAMIKI POD VLIIANIEM NAGRUSKI OB'EMOM V NORME I PRI EKSPERIMENTAL'NOM INFARKTE MIOKARDA]

T. E. KOCHETENKO, S. A. PATSKINA, and O. I. LISSOVA (Akademiiia Nauk Ukrainskoi SSR, Institut Kibernetiki, Kiev, Ukrainian SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol. 30, July-Aug. 1984, p. 431-438. In Russian. refs

The circulatory effects of volume loading were studied in repeated experiments on healthy unanesthetized dogs and on dogs with experimentally induced myocardial infarctions. Measurements were taken of cardiac output, heart rate, arterial and central venous pressure before and after infusion with blood (10 ml/kg) and an equivalent amount of polyglucinum. It is found that the reaction of

the circulatory system to the volume loading with blood was characterized by constancy with respect to cardiac output and venous pressure, and by slowing of the heart rate. Volume loading with polyglucinum resulted in a significant increase in cardiac output and a decrease in total peripheral resistance, while changes in heart rate were insignificant. In dogs with experimentally induced acute myocardial infarctions, the circulatory effects of volume loading were less pronounced.

I.H.

A85-26261

THE EFFECT OF PARADOXICAL SLEEP DEPRIVATION ON THE LEARNING OF THE ACTIVE AVOIDANCE REACTION [VLIIANIE DEPRIVATSII PARADOKSAL'NOGO SRA NA OBUCHENIE REAKTSII AKTIVNOGO IZBEGANIIA]

T. N. ORIANI (Akademiiia Nauk Gruzinskoi SSR, Institut Fiziologii, Tbilisi, Georgian SSR) Fiziologicheskii Zhurnal (Kiev) (ISSN 0201-8489), vol. 30, Sept.-Oct. 1984, p. 587-592. In Russian. refs

The effect of paradoxical sleep deprivation on the ability of rats to learn an active avoidance reaction was determined before and after active avoidance training. The effect of an increased presence of paradoxical sleep in the sleep-wakefulness cycle on the retention of the learned response, and changes in the emotional states of the rats due to paradoxical sleep deprivation were also investigated. It is shown that preliminary paradoxical sleep deprivation following the training sessions facilitated the acquisition of the active avoidance response. The increased presence of paradoxical sleep in the sleep-wakefulness cycle had no effect on the retention of the learned response. It is concluded that paradoxical sleep deprivation in a water tank did not disturb memory trace consolidation in the rats and did not impede the conversion of short-term memory into long term memory.

I.H.

A85-26285

THE ROLE OF MITOCHONDRIA IN THE REGULATION OF CA(2+) TRANSMEMBRANE CURRENT IN MYOCARDIAL CELLS [UCHASTIE MITOKHONDRII V REGULIATSII TRANSMEMBRANNOGO TOKA CA(2+) VNUTR' KLETOK MIOKARDA]

V. V. ALABOVSKII (Voronezhskii Meditsinskii Institut, Voronezh, USSR) and V. I. KOBIN (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) Uspekhi Fiziologicheskikh Nauk (ISSN 0301-1798), vol. 16, Jan.-Mar. 1985, p. 3-20. In Russian. refs

The ability of mitochondria to free H(+) and K(+) ions through the accumulation of Ca(2+) ions in myocardial cells is discussed, with reference to a number of experimental results. On the basis of an analysis of the available literature, it is proposed that mitochondria impede the inflow of Ca(2+) in pathological states. A schematic diagram is presented to illustrate the process of depolarization in the plasmatic membranes of myocardial cells due to the removal of K(+) ions by mitochondria.

I.H.

A85-26286

NEUROCHEMICAL MECHANISMS FOR THE REGULATION OF PAIN SENSITIVITY [NEIROKhimICHESKIE MEKHANIZMY REGULIATSII BOLEVOI CHUVSTVITEL'NOSTI]

E. O. BRAGIN (Tsentral'nyi Nauchno-Issledovatel'skii Institut Refleksoterapii, Moscow, USSR) Uspekhi Fiziologicheskikh Nauk (ISSN 0301-1798), vol. 16, Jan.-Mar. 1985, p. 21-42. In Russian. refs

The results of a number of experimental investigations of the neurochemical mechanisms for the regulation of pain sensitivity are reviewed. Particular attention is given to the role of opioids and monoaminergic compounds in the brain in the activation of antinociceptive (ANC) mechanisms. It is shown that the regulation of pain sensitivity is performed by ANC systems which have qualitatively different neurochemical composition. The processes by which ANC systems develop to conform to specific stimuli are also discussed.

I.H.

51 LIFE SCIENCES (GENERAL)

A85-26287

THE LOCOMOTOR REGION OF THE TRUNCUS CEREBRI AND THE HYPOTHESIS OF A LOCOMOTOR COLUMN [LOKOMOTORNAIA OBLAST' MOZGOVOGO STVOLA I GIPOTEZA O 'LOKOMOTORNOI KOLONNE']

M. L. SHIK (Akademii Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR) *Uspekhi Fiziologicheskikh Nauk* (ISSN 0301-1798), vol. 16, Jan.-Mar. 1985, p. 76-95. In Russian. refs

It is shown experimentally that the stimulation of specific regions of the trucus cerebri region of the brain can induce locomotion in cats in the following conditions: (1) when the large hemispheres and intermediate regions of the brain have been removed; and (2) when the animal is incapable of walking independently due to exteroceptor stimulation. A description is presented of the neuronal response in the oblongata brain and the upper cervical regions to stimulation of the locomotor regions. It is suggested that the neurons of the locomotor region are organized in columns which penetrate the entire axial portion of the central nervous system.

I.H.

A85-26288

THE PHYSIOLOGICAL ROLE OF ADRENERGIC ELEMENTS OF THE HYPOTHALAMUS IN THE REGULATION OF HYPOTHALAMO-ADENOHYPHYSAL SYSTEMS OF ADAPTATION [FIZIOLOGICHESKAIA ROL' ADRENERGICHESKIKH ELEMENTOV GIPOHALAMUSA V REGULIATSII GIPOHALAMO-ADENOGLIPOFIZARNYKH ADAPTATSIONNYKH SISTEM]

M. S. RASIN (Poltavskii Meditsinskii Stomatologicheskii Institut, Poltava, Ukrainian SSR) *Uspekhi Fiziologicheskikh Nauk* (ISSN 0301-1798), vol. 16, Jan.-Mar. 1985, p. 96-114. In Russian. refs

An analysis is presented of the available experimental data concerned with the role of adrenergic compounds in the regulation of the hormonal mechanisms of adaptation. Consideration is given to the following mechanisms: the corticotropin-adrenocorticotropin-adrenocorticosteroid system; the somatotropin-somatotrophin system; and the thyrotopin-thyrotropin system. The activating effects of catecholamines on interactions between these compounds are examined. It is shown that the postganglionic neurons of the sympathetic nervous system are a mechanism for the activation of the catecholamine-adrenocorticotrophin-corticosteroid system. The noradrenergic inhibition of the hypothalamo-hypophyseal adrenocortical and sympathoadrenal system appears to be a homeostatic mechanism due to the incorporation of noradrenergic elements in the system of reverse connections in adaptation complexes.

I.H.

A85-26297

NONLINEAR AND PARAMETRIC RESONANCE IN HUMAN HEARING AND SIGHT ORGANS [NELINEINYE I PARAMETRICHESKIE REZONANSY V ORGANAKH SLUKHA I ZRENIIA CHELOVEKA]

V. E. PROKOPEV (Akademii Nauk SSSR, Institut Optiki Atmosfery, Tomsk, USSR) *Biofizika* (ISSN 0006-3029), vol. 30, Jan.-Feb. 1985, p. 129-132. In Russian. refs

The nonlinear and parametric resonance of human hearing and sight organs is studied theoretically. A series of parametric equations is formulated to describe the acoustic properties of the combination tones ω_2 - ω_1 and $2\omega_1$ - ω_2 , which occur in the hearing organs under stimulation by low intensity acoustic signals. A theoretical model for the phenomenon of nonlinear vision is proposed, on the basis of the available experimental data for the cis-trans-isomerization of chromophore retinal pigments. Additional applications of nonlinear resonance theory to the study of biological systems is examined.

I.H.

A85-26298

THE PHYSICAL BASIS FOR THE GENERATION OF NEUROMAGNETIC FIELDS [FIZICHESKIE OSNOVY GENERATSII NEIROMAGNITNYKH POLEI]

V. L. VVEDENSKIY, R. HARI, R. ILMONIEMI, and K. REINIKAINEN (Akademii Nauk SSSR, Institut Atomnoi Energii, Moscow, USSR; Helsinki University of Technology, Espoo, Finland) *Biofizika* (ISSN 0006-3029), vol. 30, Jan.-Feb. 1985, p. 154-158. In Russian. refs

N85-18556# Mount Sinai School of Medicine, N. Y. Dept. of Biochemistry.

RESPIRATORY CHAIN OF ALKALOPHILIC BACTERIA Annual Progress Report, 1 Jul. 1983 - 30 Apr. 1984

T. A. KRULWICH 1984 5 p refs
(Contract DE-AC02-81ER-10871)
(DE84-012558; DOE/ER-10871/T1) Avail: NTIS HC A02/MF A01

The respiratory chain of alkalophilic bacteria was studied and it is indicated that these organisms possess specific adaptations to meet the unusual energy demands of life at high pH. Respiratory chain components were studied. The cytochrome oxidase from *Bacillus firmus* RAB was purified and characterized. Proton pumping studies by reconstituted preparations were started. The interesting problem of the regulation of cytochrome levels in the alkalophiles was examined via pH shift experiments and via a new hypothetical framework which may generate an experimental approach to the mechanism whereby nonalkalophilic mutants have greatly reduced cytochrome levels.

DOE

N85-18557# Columbia Univ., New York. Radiological Research Lab.

RADIATION PHYSICS, BIOPHYSICS, AND RADIATION BIOLOGY Progress Report, 1 Dec. 1983 - 30 Nov. 1984

H. H. ROSSI and E. J. HALL Jul. 1984 410 p refs
(Contract DE-AC02-83ER-60142)
(DE84-014885; DOE/ER-60142/2) Avail: NTIS HC A18/MF A01

Research progress is reported in the areas of radiation physics, biophysics, and radiation biology. Topics discussed include: general physics, dosimetry, microdosimetry, cell survival after irradiation, radiochemistry, and cell biology.

DOE

N85-18558# European Space Agency, Paris (France).

GRAVITY AND BIOLOGICAL SYSTEMS: EMPHASIS ON HUMAN PHYSIOLOGY

H. HINGHOFER-SZALKAY (Technical Univ., Graz) Oct. 1984 27 p refs Original contains color illustrations
(Contract ESA-83/66)
(ESA-BR-21; ISSN-0250-1589) Avail: NTIS HC A03/MF A01

Gravitational effects on human visual, vestibular, and kinesthetic judgments; muscles, bones, and joints; cardiovascular system under varying g-stress; blood, and other body fluids; and regulatory systems are discussed. Micro-g simulations, and their limitations; and real weightlessness are considered. Potential ESA human physiology life sciences programs including the AnthroRack concept are outlined.

Author (ESA)

N85-18559# Joint Publications Research Service, Arlington, Va. USSR REPORT: LIFE SCIENCES. BIOMEDICAL AND BEHAVIORAL SCIENCES

23 Jan. 1985 178 p refs Transl. into ENGLISH from various Russian articles
(JPRS-UBB-85-002) Avail: NTIS HC A09/MF A01

Progress in research and development in the areas of life sciences, biomedical, and behavioral sciences are reported. Topics discussed include: aerospace medicine, agrotechnology, biochemistry, environmental sciences, epidemiology, food technology, genetics, human factors engineering, immunology, laser application and effects, microbiology, nonionizing and electromagnetic radiation effects, pharmacology and toxicology, physiopathology, public health, psychology, veterinary medicine, and virology.

N85-18560# Joint Publications Research Service, Arlington, Va.
GROWTH OF SOIL BACTERIA IN PRESENCE OF MARTIAN SOIL ANALOG, CARBON DIOXIDE AND HYDROGEN PEROXIDE
Abstract Only

A. A. IMSHENETSKIY, B. G. MURZAKOV, M. D. YEVDOKIMOVA, and I. K. DOROFYEVA *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-002) p 1 23 Jan. 1985 Transl. into ENGLISH from Mikrobiol. (Moscow), v. 53, no. 4, Jul.- Aug. 1984 p 605-608*

Avail: NTIS HC A09/MF A01

The composition of soil bacterial communities growing in mixture of minerals modeling Martian soil in the presence of carbon dioxide gas and hydrogen peroxide were analyzed. After cultivation of experimental specimens, bacteria were grown in a meat peptone broth in a thermostat at 28 deg C under ordinary laboratory conditions and at 28 deg C in aerostats filled with carbon dioxide. A significant decreases in the number of bacteria upon cultivation under aerobic conditions and in the aerostats in comparison to the initial quantity, in the presence of the soil analog, and in soil specimens without addition of the analog are shown. It is found that a very high content of carbon dioxide and the presence of a mixture of minerals may include the existence of microorganisms. It is emphasized that spore forming microorganisms under these conditions have higher sensitivity to unfavorable factors in the environment, and their vegetative growth occurs intensively when the conditions become favorable. E.A.K.

N85-18562# Joint Publications Research Service, Arlington, Va.
EFFECT OF MODULATED ULTRAHIGH FREQUENCY FIELD ON BEHAVIOR AND HORMONE LEVEL IN FEMALE RATS UNDER EMOTIONAL STRESS
Abstract Only

M. M. RASULOV *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-002) p 123 23 Jan. 1985 Transl. into ENGLISH from Patologicheskaya Fiz. i Eksperim. Terapiya (Moscow), no. 3, May - Jun. 1984 p 13-16 Original language document was announced in IAA as A84-41391*

Avail: NTIS HC A09/MF A01

The effect of a modulated electromagnetic field (MEMF) on behavior and sexual hormones level of, determined from the length of the estrous cycle and of its separate phases, was studied in female Wistar rats subjected to sexual deprivation. The ratio of frequency of running to number of vertical positions (R:V) was used as an index. The relative significance of sexual behavior more than doubled in comparison with the initial level. The existence of individual differences in sensitivity to a UHF field is confirmed. The data on the estrous cycle indicate the tranquilizing effect of a UHF field on the neuroendocrine system and the greater resistance of individual animals exposed to MEMF to the development of sexual neurosis. E.A.K.

N85-18564# Joint Publications Research Service, Arlington, Va.
FUNCTIONAL AND STRUCTURAL CHANGES IN HUMAN ERYTHROCYTE SURFACE AFTER IRRADIATION BY UV WAVES OF VARIOUS WAVELENGTHS. REPORT 1: EXPRESSION OF ABO AND RHESUS SYSTEM ANTIGEN
Abstract Only

K. A. SAMOYLOVA, K. N. KLIMOVA, L. S. PRIYEZZHEVA, and R. A. ARTSISHEVSKAYA *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-002) p 124-125 23 Jan. 1985 Transl. into ENGLISH from Tsitologiya (Leningrad), v. 25, no. 12, Dec. 1983 p 1378-1386*

Avail: NTIS HC A09/MF A01

The effect of shortwave ultraviolet (SUV) radiation ad causes change in the external surface of human erythrocytes, modifying the expression of the ABO and Rh system antigens which are related to the surface of the cells was investigated. Erythrocytes in a structurally prepared erythrocyte mass from 23 donors stabilized by glucir or heparin were examined. Three series of experiments were performed: (1) isolated erythrocytes, before irradiation thrice washed to remove plasma with isotonic NaCl 0.9%, erythrocytes diluted to 5 x s10 to the 7th power cells per milliliter; and erythrocytes on the undiluted erythrocyte mass about 7 x 5 x 10⁹ to the 9th power cells power milliliter. The agglutinating

activity of the ABO and Rh antigens was studied. Two to three hours after exposure to 248, 620, 1240 and 2480 J/m², the degree of hemolysis of isolated erythrocytes increased by 5,10,18 and 28%. Changes were also observed in agglutinating activity of ABO antigens. The agglutinating activity of A and B antigens increased by an average factor of 2 minus H antigens by a factor of 4. The SUV radiation did not cause any activation of the Rh antigen.

E.A.K.

N85-18565# Joint Publications Research Service, Arlington, Va.
FUNCTIONAL AND STRUCTURAL CHANGES IN HUMAN ERYTHROCYTE SURFACE AFTER IRRADIATION BY UV WAVES OF VARIOUS WAVELENGTHS. REPORT 2: ADSORPTION OF ALCYAN BLUE BY EXTERNAL PREMEMBRANOUS COMPONENTS
Abstract Only

R. A. ARTSISHEVSKAYA and K. A. SAMOYLOVA *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-002) p 125 23 Jan. 1985 Transl. into ENGLISH from Tsitologiya (Leningrad), v. 25, no. 12, Dec. 1983 p 1387-1392*

Avail: NTIS HC A09/MF A01

A method to quantitatively determine the external premembranous layers of cells was used to determine the extent to which shortwave ultraviolet (SUV) radiation influences the status of this structure in human erythrocytes. Manifestation of external premembranous layers in nonirradiated and irradiated erythrocytes was judged by the adsorption of a cationic phthalocyanine dye. Optimal staining conditions were found: concentration of cell suspension 10 to the 8th power cells/ml, concentration of dye solution 0.005%, staining time 10 minutes. The influence of SUV on adsorption of erythrocytes results in a reliable decrease in dye sorption. Small and medium doses cause a reduction in sorption, while the highest dose used, 3720 J/m², causes an increase of 19.5% in dye sorption, sometimes up to 40 to 50%. It is assumed structural perturbation of the erythrocyte surface may cause activation not only of ABO and Rh antigens, but also other antigens, and changes in a number of properties and functions of the cells which involve specialized cell surface systems such as receptors and enzyme groups. E.A.K.

N85-18566# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES. BIOMEDICAL AND BEHAVIORAL SCIENCES

6 Feb. 1985 245 p refs Transl. into ENGLISH of various Russian articles (JPRS-UBB-85-007) Avail: NTIS HC A11

Various topics in the life sciences are addressed, including agrotechnology, biochemistry, biophysics, biotechnology, ecology, and epidemiology. In addition, food technology, genetics, immunology, laser effects, medicine, microbiology, molecular biology, toxicology, physiology, public health, and radiation biology are considered.

N85-19599# Texas Univ. Health Science Center, San Antonio. Dept. of Radiology.

GENETIC EFFECTS OF MICROWAVE EXPOSURE ON MAMMALIAN CELLS IN VITRO. VOLUME 2, APPENDIX A: CYTOGENETICS AND GROWTH KINETICS DATA, 850 MHZ Annual Report, 1 Jul. 1981 - 30 Sep. 1982

M. L. MELTZ, C. R. HARRIS, and K. A. WALKER Oct. 1984 44 p 2 Vol.

(Contract F33615-80-C-0607)

(AD-A148866; USAFSAM-TR-84-24-APP-A) Avail: NTIS HC

A03/MF A01 CSCL 06R

This work is a continuation of studies designed to answer the question of whether radio frequency radiation (RFR) at lower power levels (no greater than 10 mW/sq cm), where measurable heating in the exposure system cannot be detected, causes any transient or permanent alteration in series of subtle biochemical processes elicited in the DNA of mammalian cells. The specific process(es) being studied are: the effects of RFR on repair synthesis in normal human fibroblasts after ultraviolet light damage of the DNA; and the possible induction by RFR of sister chromatid exchanges or chromosome aberrations in Chinese Hamster Ovary cells.

51 LIFE SCIENCES (GENERAL)

Additional information obtained in the latter studies includes any effects on cell viability (by cloning efficiency) or on cell growth (increase in cell number). GRA

N85-19600# Texas Univ. Health Science Center, San Antonio. Dept. of Radiology.

GENETIC EFFECTS OF MICROWAVE EXPOSURE ON MAMMALIAN CELLS IN VITRO. VOLUME 2, APPENDIX B: CYTOGENETICS AND GROWTH KINETICS DATA, 1.2 GHZ Annual Report, 1 Jul. 1981 - 30 Sep. 1982

M. L. MELTZ, C. R. HARRIS, and K. A. WALKER Oct. 1984 70 p 2 Vol.
(Contract F33615-80-C-0607)
(AD-A148867; USAFSAM-TR-84-24-APP-B) Avail: NTIS HC A04/MF A01 CSCL 06R

Tabular data from cell survival experiments are included. Chromosome response to radiation effects are listed. B.G.

N85-19601# Tulane Univ., Covington, La. Delta Regional Primate Research Center.

BIOMECHANICAL STUDIES OF IMPACT ACCELERATION RESEARCH Final Technical Report

P. J. GERONE 15 Dec. 1984 8 p
(Contract N00014-77-C-0305; NR PROJ. 207-086)
(AD-A149077) Avail: NTIS HC A02/MF A01 CSCL 06S

Nonhuman primates were maintained for studies on the biomechanics of acceleration impact research by Navy personnel at Navy facilities. At one time or another during the course of this contract a total of 32 nonhuman primates were housed for the Navy. This included 13 chimpanzees (*Pan troglodytes*) and 19 rhesus monkeys (*Macaca mulatta*). Twelve of the 13 chimpanzees were still available at the close of this contract. One of the chimpanzees died on January 24, 1983. The rhesus monkeys remained on the contract until they were transferred to Navy facilities on March 1, 1984. GRA

N85-19602# Columbia Univ., New York. Dept. of Psychology.

BIOELECTROCHEMISTRY 2: MEMBRANE PHENOMENA

D. SCHACTER 11 Dec. 1984 8 p
(Contract N00014-84-G-0183)
(AD-A149132) Avail: NTIS HC A02/MF A01 CSCL 06A

The second advanced course on bioelectrochemistry at the International School of Biophysics took place at the Majorana Center in Erice, Italy, during 5-15 November 1984. Three years ago, the first such meeting, also organized by G. MILAZZO (Rome) and M. Blank (New York), had been devoted to redox processes, a subject with strong and obvious links to electrochemistry. The subject of this meeting, membrane phenomena, was much broader, but the emphasis was on the electrochemical aspects of ion transport, energy transduction, and signal conduction. In addition, there were discussions on three practical applications of bioelectrochemistry, the effects of applied electric fields on membranes, mediated and non-mediated transport of pharmacologic agents and the exploitation of information about biological membranes in the development industrial processes. GRA

N85-19603# Texas Univ. Health Science Center, San Antonio. Dept. of Radiology.

GENETIC EFFECTS OF MICROWAVE EXPOSURE ON MAMMALIAN CELLS IN VITRO, VOLUME 2 Annual Report, 1 Jul. 1981 - 30 Sep. 1982

M. L. MELTZ, C. R. HARRIS, and K. A. WALKER Oct. 1984 91 p 2 Vol.
(Contract F33615-80-C-0607)
(AD-A149347; USAFSAM-TR-84-24-VOL-2) Avail: NTIS HC A05/MF A01 CSCL 06R

This work is a continuation of studies designed to answer the question of whether radiofrequency radiation (RFR) at lower power levels (no greater than 10 mW/sq cm), where measurable heating in the exposure system cannot be detected, causes any transient or permanent alteration in a series of subtle biochemical processes elicited in the DNA of mammalian cells. The specific process(es)

being studied are: the effects of RFR on repair synthesis in normal human fibroblasts after ultraviolet light damage of the DNA; and the possible induction by RFR of sister chromatid exchanges or chromosome aberrations in Chinese Hamster Ovary cells. Additional information obtained in the latter studies includes any effects on cell viability (by cloning efficiency) or on cell growth (increase in cell number). GRA

N85-19604# Oak Ridge National Lab., Tenn.

ARTIFICIAL PHOTOSYNTHESIS WITH ALGAL AND RECONSTITUTED SYSTEMS

E. GREENBAUM, M. E. REEVES (Tennessee Univ., Knoxville), and J. WOODWARD 1984 22 p refs Presented at US-Japan Inform. Exchange Seminar on Photochem. Energy Solar Conversion, Okazaki, Japan, 12 Mar. 1984
(Contract DE-AC05-84OR-21400)

(DE85-002557; CONF-840389-7) Avail: NTIS HC A02/MF A01

A general review of artificial of hydrogenic photosynthesis for the direct production of molecular oxygen and hydrogen is presented. A summary of the Oak Ridge National Laboratory's experimental research program on photosynthetic water splitting using algae is included. The rates of hydrogen and oxygen production in continuous-wave light must be improved significantly before practical developments can proceed. DOE

N85-19605# Joint Publications Research Service, Arlington, Va. **USSR REPORT: LIFE SCIENCES. BIOMEDICAL AND BEHAVIORAL SCIENCES Abstracts Only**

13 Feb. 1985 79 p refs Transl. into ENGLISH of various Russian articles
(JPRS-UBB-85-008) Avail: NTIS HC A05/MF A01

Advances are reported in agrotechnology, biochemistry, biophysics, ecology, pollution control, food technology, genetics, immunology, laser effects, microbiology, molecular biology, pharmacology, toxicology, physiology, virology, radiation biology, human factors, public health, nonionizing radiation effects, and medical therapy.

N85-19615# Joint Publications Research Service, Arlington, Va. **INFLUENCE OF HYPERTERMIA ON BODY TEMPERATURE AND CONTENT OF CATECHOLAMINES IN WHITE RAT HYPOTHALAMUS Abstract Only**

F. F. SULTANOV, K. A. MEZIDOVA, and B. N. MANUKHIN *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci.* (JPRS-UBB-85-008) p 46 13 Feb. 1985 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 277, no. 5, Aug. 1984 p 1274-1275

Avail: NTIS HC A05/MF A01

The dynamics of the biogenerate monoamines (noradrenaline, dopamine, and serotonin) were studied in the hypothalamus of rats during hyperthermia and for a period of 10 days after hyperthermia. Experiments were performed on male Wistar white rats, placed in a well-ventilated heating chamber for 30 and 60 minutes at a temperature of 45 C. Rectal temperature was monitored. After 30 minutes of hyperthermia, the hypothalamus undergoes significant changes in terms of its content of noradrenaline, dopamine and serotonin, with a reliable increase in noradrenaline during hyperthermia, followed after 24 hours by a drop to 43% below the level of the control, an increase by 48 hours, then gradual normalization. The dynamics of the content of dopamine are similar to those of noradrenaline. The content of serotonin changes approximately the same way as the catecholamines, although the changes are less severe, never falling below the control. Hyperthermia thus causes long-term changes in the metabolism of biogenous amines in the hypothalamus.

Author

N85-19616# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES. BIOMEDICAL AND BEHAVIORAL SCIENCES Abstracts Only

26 Feb. 1985 93 p Transl. into ENGLISH from various Russian articles

(JPRS-UBB-85-011) Avail: NTIS HC A05/MF A01

This U.S.S.R. report presents research developments in biomedical and behavioral sciences. Subject matter covered includes: (1) aerospace medicine; (2) human factors; (3) electrosleep therapy; and (4) visual recognition processes.

N85-19625# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES. BIOMEDICAL AND BEHAVIORAL SCIENCES

19 Feb. 1985 64 p refs Transl. into ENGLISH from various Russian articles

(JPRS-UBB-85-009) Avail: NTIS HC A04/MF A01

The following topics relating to biomedical and behavioral sciences are considered: aerospace medicine, biotechnology, medicine, pharmacology and toxicology, physiology, public health, and veterinary medicine.

52

AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

A85-22776

FACTORS INFLUENCING THE INCIDENCE AND SEVERITY OF 'EJECTION ASSOCIATED' NECK INJURIES SUSTAINED BY U.S. NAVY EJECTEES 1 JANUARY 1969 THROUGH 31 DECEMBER 1979 - A PRELIMINARY REPORT

F. C. GUILF (U.S. Naval Air Systems Command, Crew Systems Div., Washington, DC) IN: SAFE Association, Annual Symposium, 21st, San Antonio, TX, November 5-8, 1983, Proceedings. Van Nuys, CA, SAFE Association, 1984, p. 217-230.

Investigating medical officers when confronted by an ejectionee having a serious neck injury (sprain, strain, fracture, subluxation, transection) have generally examined the ejection process as the sole source of the forces necessary to produce the injury. A number of 'classical' explanations have evolved to explain these injuries: poor positioning of the body, ejection boost forces too high, windscoop effect acting upon the ejectionee's helmet, and parachute opening shock effects being among the commonest. Some medical officers have truly strained to force fit the data into one of these 'classical' causal factors. In-depth review of original medical officer's reports suggests several injury causal factors often overlooked include pre-ejection aircraft maneuver, post-separation collisions of man and seat, ground contact, and rescue attempts, and that often several potential causal factors were present at various times during an escape and rescue process. Author

A85-23151

METHODOLOGY AND TECHNIQUES OF PSYCHOPHYSIOLOGICAL STUDIES OF OPERATOR ACTIVITY [METODIKA I TEKHNIKA PSIKHOFIZIOLOGICHESKIKH ISSLEDOVANII OPERATORSKOI DEIATEL'NOSTI]

V. G. VOLKOV, ED. Moscow, Izdatel'stvo Nauka, 1984, 104 p. In Russian. For individual items see A85-23152 to A85-23166.

Papers are presented on such topics as: the psychophysiological study of visual fatigue and the recovery of the initial level of work capacity; effect of daily routine on the functional state of operators according to heart-rhythm parameters; the adaptivity of the eye-hand system of human operators; and the use of acupuncture to correct psychophysiological states. Consideration is also given to: psychophysiological methods for the assessment of the state of a human operator during the controlled effect of ethyl alcohol; the assessment of the functional

reserves of an operator in a state of fatigue; the use of contingent negative variations as an EEG index for evaluating the characteristics of an operator; and the functional state of a human operator during the formation of a mental habit. Other topics discussed are: the development of a complex of programs of spectral EEG analysis for the operational diagnostics of the functional state of operators; the application of active oculography and electroneuromyography to analyze the effect of drugs; and a method for comparing the simple sensorimotor responses of interacting operators.

B.J.

A85-23152

PSYCHOPHYSIOLOGICAL STUDY OF VISUAL FATIGUE AND RECOVERY OF THE INITIAL LEVEL OF WORK CAPACITY [PSIKHOFIZIOLOGICHESKOE ISSLEDOVANIE PROTSESSOV ZRITEL'NOGO UTOMLENIIA I VOSSTANOVLENIIA ISKHODNOGO UROVNIYA RABOTOSPOSOBNOSTI]

V. A. POLIANTSEV, A. G. RUMIANTSEVA, and V. A. OSIPOV IN: Methodology and techniques of psychophysiological studies of operator activity. Moscow, Izdatel'stvo Nauka, 1984, p. 3-9. In Russian. refs

Experiments were performed on eight males 18-23 years of age in order to evaluate: (1) the diagnosis of acute visual fatigue by recording evoked potentials of the brain in the course of a visual detection task; and (2) the recovery of the initial level of work capacity using psychomuscular relaxation. The type of fatigue studied extended only to the central structures of the brain and did not have an effect on the cardiovascular system, which distinguished it from general nonspecific fatigue. Relaxation facilitated the recovery of the initial functional state of cortex structures and the level of work capacity.

B.J.

A85-23153

EFFECT OF DAILY ROUTINE ON THE FUNCTIONAL STATE OF OPERATORS ACCORDING TO HEART-RHYTHM PARAMETERS [VLIJANIE RASPORIADKA ZHIZNEDEIATEL'NOSTI NA FUNKTSIONAL'NOE SOSTOIANIE OPERATOROV PO POKAZATELIAM SEREDETECHNOGO RITMA]

V. N. ARTISHUK, V. N. MALIUGIN, and V. F. SHEVCHENKO IN: Methodology and techniques of psychophysiological studies of operator activity. Moscow, Izdatel'stvo Nauka, 1984, p. 9-17. In Russian. refs

Experimental results are presented concerning the simulation of the shift work of operators, and it is shown that the daily routine of operators can be studied effectively by measuring heart-rhythm stability and pulse rate. It is demonstrated that, depending on the conditions, the effect of daily-routine regimes can be expressed either in adaptive changes of physiological systems or in the stress responses of these systems.

B.J.

A85-23155

THE USE OF ACUPUNCTURE TO CORRECT PSYCHOPHYSIOLOGICAL STATES IN HUMANS [ISPOL'ZOVANIE METODIKI IGLOREFLEKSOTERAPII DLIA KORREKTSII PSIKHOFIZIOLOGICHESKOGO SOSTOIANIIA CHELOVEKA]

E. Z. TEL, A. M. ZINGERMAN, and N. N. VASILEVSKII IN: Methodology and techniques of psychophysiological studies of operator activity. Moscow, Izdatel'stvo Nauka, 1984, p. 21-28. In Russian. refs

The efficiency of acupuncture to correct psychosomatic disturbances in the case of borderline and neurosis-like states is assessed on the basis of questionnaire tests of differential self-evaluation of personal and reactive anxiety. It is shown that acupuncture at the gJ4, RP-6, and MC6 points is effective when there is a predominance of such general neurotic symptoms as light fatigue, mood instability, irritability, anxiety, and reduced work capacity. It is concluded that acupuncture correction of a general psychophysiological state on the basis of the above-mentioned tests is a promising technique.

B.J.

52 AEROSPACE MEDICINE

A85-23157

PSYCHOPHYSIOLOGICAL METHODS FOR THE ASSESSMENT OF THE STATE OF A HUMAN OPERATOR DURING THE CONTROLLED EFFECT OF ETHANOL [PSIKHOFIZIOLOGICHESKIE METODY OTSENKI SOSTOIANIIA CHELOVEKA-OPERATORA V USLOVIIAKH KONTROLIRUEMOGO VOZDEISTVIIA ETANOLA]

N. A. ERASHCHENKO, L. P. LATASH, and A. IU. MAGALIF IN: Methodology and techniques of psychophysiological studies of operator activity . Moscow, Izdatel'stvo Nauka, 1984, p. 36-42. In Russian. refs

It is demonstrated that the central effects of ethanol intoxication at a blood concentration of 0.07-0.1 percent can be clearly determined by a test assessing the temporal characteristics of speech and by tests involving simple motor reaction and motor reaction with tracking and selection. For an ethanol concentration in the blood of 0.04-0.05 percent, indeterminate changes of speech parameters occur, with speech acceleration predominating, while the operant tests do not reveal deviations from control values.

B.J.

A85-23158

ASSESSMENT OF FUNCTIONAL RESERVES OF AN OPERATOR IN A STATE OF FATIGUE [OTSENKA FUNKTSIONAL'NYKH REZERVOV U OPERATORA V SOSTOIANII UTOMLENIIA]

E. P. SVIRIDOV IN: Methodology and techniques of psychophysiological studies of operator activity Moscow, Izdatel'stvo Nauka, 1984, p. 42-46. In Russian. refs

Experimental results are presented concerning long-term operator activity involving the recognition of noisy visual images. The information content of vegetative characteristics and the parameters of the eye-lid motor reaction (ELMR) in analyzing fatigue are evaluated, and the ELMR is shown to be effective in assessing fatigue during the long-term recognition of noisy visual images. A test for monitoring the functional reserves of a human operator during long-term work is proposed.

B.J.

A85-23160

SLOW NEGATIVE POTENTIALS AND PROBABILISTIC PREDICTION [MEDLENNYE OTRITSATEL'NYE POTENTSIALY I VEROIATNOSTNOE PROGNOZIROVANIE]

V. A. BALABANOVA IN: Methodology and techniques of psychophysiological studies of operator activity . Moscow, Izdatel'stvo Nauka, 1984, p. 59-64. In Russian. refs

The possibility of using contingent negative variation (CNV) or slow negative potentials as an EEG index for evaluating individual features of a human operator is substantiated. A method for the dynamic analysis of CNV is proposed which is based on the relationship between CNV and probabilistic prediction. Experimental data on the use of CNV in normal and pathological conditions are presented.

B.J.

A85-23163

DEVELOPMENT OF A COMPLEX OF PROGRAMS OF SPECTRAL EEG ANALYSIS FOR THE OPERATIONAL DIAGNOSTICS OF THE FUNCTIONAL STATE OF HUMAN OPERATORS [RAZRABOTKA KOMPLEKSA PROGRAMM SPEKTRAL'NOGO ANALIZA EEG DLIA OPERATIVNOI DIAGNOSTIKI FUNKTSIONAL'NOGO SOSTOIANIIA CHELOVEKA-OPERATORA]

S. A. VARASHKEVICH and L. G. DIKAIA IN: Methodology and techniques of psychophysiological studies of operator activity . Moscow, Izdatel'stvo Nauka, 1984, p. 75-79. In Russian. refs

A software complex of long-term EEG realizations has been developed which is intended for the analysis of the dynamics of brain activity under determinate excitations causing changes in functional state. The application of the complex is illustrated by experimental results on the multiparametric spectral analysis of long-term recordings of EEG signals. It is concluded that the proposed method can be used in monitoring the current functional state of human operators and in biofeedback systems.

B.J.

A85-23164

THE STRESS INDEX AS AN INDEX OF THE WORK STATE OF AN OPERATOR [INDEKS NAPRIAZHENIIA KAK POKAZATEL' RABOCHEGO SOSTOIANIIA OPERATORA]

A. K. EPISHKIN, V. F. SHEVCHENKO, and V. A. SHILOVA IN: Methodology and techniques of psychophysiological studies of operator activity . Moscow, Izdatel'stvo Nauka, 1984, p. 85-89. In Russian. refs

The use of Baevskii's (1979) stress index (a parameter based on heart-rhythm dynamics) to analyze the psychophysiological state of a human operator in various regimes of work is examined. A relationship is established between the value of the stress index and the probability of recognition of tonal signals by operators in a state of adaptation and fatigue.

B.J.

A85-23165

APPLICATION OF ACTIVE OCULOGRAPHY AND ELECTRONEUROMYOGRAPHY TO ANALYZE THE EFFECT OF DRUGS [PRIMENENIE METODA AKTIVNOI OKULOGRAFII I ELEKTRONEIROMIOGRAFFI DLIA ANALIZA EFFEKT FARMAKOLOGICHESKIKH VOZDEISTVII]

G. N. AVAKIAN, N. I. KOVALEVA, and V. M. MASHKOVA IN: Methodology and techniques of psychophysiological studies of operator activity . Moscow, Izdatel'stvo Nauka, 1984, p. 89-94. In Russian. refs

The paper examines results of a study involving the application of active oculography (AO) and electroneuromyography (ENM) to monitor the effects of amiridine and cerebrolysinum on the treatment of patients with cerebral paralysis. Amiridine is shown to improve sensorimotor performance; a reduction of latent periods was noted in AO and ENM studies. In addition, it is shown that the AO technique makes it possible to detect disorders of space perception in patients with cerebral paralysis.

B.J.

A85-23203

RESPONSES OF PEOPLE TO HEAT LOAD IN SAUNAS [REAKTSII LIUDEI NA TEPOLOVUIU NAGRZUZKU V USLOVIIAKH SAUNY]

V. A. KUZMENKO (Akademiiia Meditsinskikh Nauk SSSR, Nauchno-Issledovatel'skii Institut Normal'noi Fiziologii, Moscow, USSR) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury (ISSN 0042-8787), Sept.-Oct. 1984, p. 56-58. In Russian. refs

A85-23204

EFFECT OF DECIMETER-RANGE WAVES ON THE AGGREGATION ACTIVITY OF THROMBOCYTES, GIVEN DIFFERENT LOCALIZATIONS OF EFFECTS IN VICTIMS OF CEREBRAL INSULT [VLIIANIE VOLN DETSIMETROVOGO DIAPAZONA NA AGREGATSIONNUU AKTIVNOST' TROMBOTSITOV PRI RAZLICHNOI LOKALIZATSII VOZDEISTVIIA U BOL'NYKH, PERENESSHIKH MOZGOVOI INSUL'TI]

T. V. NUSHTAEVA (Tsentral'nyi Nauchno-Issledovatel'skii Institut Kurortologii i Fizioterapii, Moscow, USSR) Voprosy Kurortologii, Fizioterapii i Lechebnoi Fizicheskoi Kul'tury (ISSN 0042-8787), Sept.-Oct. 1984, p. 58, 59. In Russian. refs

A85-23205

HYGIENIC STANDARDIZATION OF WHOLE-BODY VIBRATION [GIGIENICHESKOE NORMIROVANIE OSHCHIKH VIBRATSII]

G. A. SUVOROV (Akademiiia Meditsinskikh Nauk SSSR, Institut Gigienny Truda i Profzabolevanii, Moscow, USSR) Gigiena Truda i Professional'nye Zabolevaniiia (ISSN 0016-9919), Oct. 1984, p. 9-13. In Russian.

The methodological principles used to promulgate public health standards for whole-body vibration in the USSR are analyzed. It is shown that effective health standards for whole-body vibration in the workplace should be based on the following considerations: (1) the physiological aspects of machine-worker interaction; (2) the health and work capacities of workers; and (3) the intensity and difficulty of the work. A classification of the symptoms of

vibration sickness is proposed for various exposure levels in the range 70-120 dB. I.H.

A85-23206

THE EVALUATION OF SUMMARY VIBRATION LOAD AND SOME BIOMEDICAL FACTORS IN DETERMINING THE RISK OF VIBRATION-INDUCED ILLNESS IN MINERS [OTSENKA SUMMARNOI VIBRONAGRUSKI I NEKOTORYKH MEDIKO-BILOGICHESKIKH FAKTOROV PRI PROGNOZIROVANII SROKOV RAZVITIIA VIBRATSIONNOI BOLEZNI U GORNORABOCHIKH]

G. M. BALAN and A. G. SHUMOV (Akademii Meditsinskikh Nauk SSSR, Institut Kompleksnykh Problem Gigienny i Professional'nykh Zabolevanii, Novokuznetsk, USSR) *Gigiena Truda i Professional'nye Zabolevanii* (ISSN 0016-9919), Oct. 1984, p. 13-16. In Russian. refs

A85-23207

A COMPARATIVE EVALUATION OF VARIOUS METHODS FOR THE TREATMENT OF MINERS WITH VIBRATION-INDUCED AND NOISE-INDUCED PATHOLOGIES [SRAVNITEL'NAIA OTSENKA RAZLICHNYKH METODOV LECHENIIA GORNORABOCHIKH S VIBRATSIONNO-SHUMOVOI PATOLOGIEI]

M. L. VELSKAIA, M. A. NEKHOROSHEVA, S. I. KONOVALOVA, G. V. KUKHTINA, I. G. GONCHAR, D. P. TERENTEVA, L. A. GRISHCHENKO, N. P. SOBOLEVA, S. A. KHARITONOV, and I. V. PRIKLONSKII (Institut Gigienny Truda i Professional'nykh Zabolevanii; Oblasnaia Klinicheskaiia Bol'niitsa Profzabolevanii; Donetskii Meditsinskii Institut, Donetsk, Ukrainian SSR) *Gigiena Truda i Professional'nye Zabolevanii* (ISSN 0016-9919), Oct. 1984, p. 16-19. In Russian. refs

A85-23208

THE CORRECTION OF MICROCIRCULATORY DISORDERS FROM VIBRATIONAL ILLNESS [KORREKTSIIA NARUSHENII MIKROTSIRKULATSII PRI VIBRATSIONNOI BOLEZNI]

M. I. LOSEVA, T. M. SUKHAREVSKAIA, A. M. PAKHOMOVA, V. A. SUTORMIN, and V. E. DIKKER (Novosibirskii Meditsinskii Institut, Novosibirsk, USSR) *Gigiena Truda i Professional'nye Zabolevanii* (ISSN 0016-9919), Oct. 1984, p. 19-22. In Russian.

The effectiveness of various treatments for microcirculatory disorders due to whole-body vibration sickness was investigated in 116 men and women. Measurements of the major parameters of microcirculatory hemostasis (capillary permeability and oxygen balance) were compared before and after treatment by conventional therapy, and by pharmaceutical therapy with the compounds heparin and venoruton. Significant increases were observed in capillary permeability and oxygen supply to the peripheral tissues following treatment with heparin and venoruton, in comparison with conventional therapies. I.H.

A85-23210

DOSE ASSESSMENT OF NOISE LOAD ON TRACTOR OPERATORS IN AGRICULTURE [DOZNAIA OTSENKA SHUMOVOI NAGRUSKI NA MEKHANIZATOROV SEL'SKOGO KHOZIAISTVA]

A. A. MENSHOV and V. N. SOGA (Institut Gigienny Truda i Profzabolevanii, Kiev, Ukrainian SSR) *Gigiena Truda i Professional'nye Zabolevanii* (ISSN 0016-9919), Oct. 1984, p. 36-38. In Russian.

A85-23211

EFFECT OF TOTAL-BODY VIBRATION AND NOISE ON THE FUNCTIONAL STATE OF HUMAN OPERATORS [VLIJANIE OBUHCHEI VIBRATSII I SHUMA NA FUNKTSIONAL'NOE SOSTOIANIE CHELOVEKA-OPERATORA]

IU. N. KAMENSKII (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Zheleznodorozhnoi Gigienny, Moscow, USSR) *Gigiena Truda i Professional'nye Zabolevanii* (ISSN 0016-9919), Oct. 1984, p. 38-39. In Russian. refs

Experiments on the effect of total-body vibration and noise on the functional state of human operators were conducted in order

to demonstrate that joint standards should be established for these two factors in man-machine systems. Results indicate that vibration, as a more powerful irritant, can mask the physiological effects of noise. The masking effect of total-body vibration is manifested at a noise level of 90 dB A (at a vibration frequency of 10 Hz and an acceleration of 1 m/sec-squared). A summation effect was observed at higher noise intensities. B.J.

A85-23212

EFFICIENCY OF THE TREATMENT OF PATIENTS WITH VIBRATION SICKNESS BY MEANS OF SINUSOIDAL MODULATED CURRENTS [OB EFFEKTIVNOSTI LECHENIIA BOL'NYKH VIBRATSIONNOI BOLEZNI SINUSOIDAL'NYMI MODULIROVANNYMI TOKAMI]

M. M. GERASIMOVA and T. S. KUPRIANOVA (Institut Gigienny Truda i Profzabolevanii, Gorki, USSR) *Gigiena Truda i Professional'nye Zabolevanii* (ISSN 0016-9919), Oct. 1984, p. 39-41. In Russian. refs

A85-23213

TREATMENT OF VIBRATION SICKNESS IN COAL MINERS BY MEANS OF HYPERBARIC OXYGENATION [LECHENIE VIBRATSIONNOI BOLEZNI U SHAKHTEROV-UGOL'SHCHIKOV GIPERBARICHESKOI OKSIGENATSIEI]

N. P. SOBOLEVA (Donetskii Meditsinskii Institut, Donetsk, Ukrainian SSR) *Gigiena Truda i Professional'nye Zabolevanii* (ISSN 0016-9919), Oct. 1984, p. 41, 42. In Russian. refs

A85-23214

OBJECTIVE EVALUATION OF VEGETOVASCULAR DYSTONIA AND PSYCHOEMOTIONAL DISTURBANCES IN PATIENTS WITH VIBRATION SICKNESS [K VOPROSU OB'EKTIVNOI OTSENKI VEGETOSOSUDISTOI DISTONII I PSIKHOEMOTSIONAL'NYKH NARUSHENII U BOL'NYKH VIBRATSIONNOI BOLEZNIU]

T. F. VASILEVA (Cheliabinskii Meditsinskii Institut, Chelyabinsk, USSR) *Gigiena Truda i Professional'nye Zabolevanii* (ISSN 0016-9919), Oct. 1984, p. 42, 43. In Russian.

A85-23216

NOISE PROTECTION OF WORKERS IN THE SAWMILL AND WOOD-PROCESSING INDUSTRY [O SHUMOZASCHITE RABOCHIHKH LESOPIL'NO-DEREVOOBRABATYVAIUSHCHEGO PROIZVODSTVA]

IU. M. ANDOSOV (Oblasnaia Sanitarno-Epidemiologicheskaiia Stantsia, Arkhangel'sk, USSR) and E. V. KLINKOVSKAIA (Gorodskaiia Sanitarno-Epidemiologicheskaiia Stantsia, Arkhangel'sk, USSR) *Gigiena Truda i Professional'nye Zabolevanii* (ISSN 0016-9919), Oct. 1984, p. 45, 46. In Russian.

A85-23219

PHYSIOLOGICAL CHARACTERIZATION OF THE WORK OF THE OPERATING PERSONNEL OF A POWER SYSTEM IN AN ARID ZONE [FIZIOLOGICHESKAIA KHARAKTERISTIKA TRUDA OPERATIVNOGO PERSONALA ENERGOSISTEMY, RABOTAIUSHCHEGO V USLOVIIAKH ARIDNOI ZONY]

I. M. Mommadov, A. G. Grigorian, and G. A. Tupikova (Akademii Nauk Turkmenetskoi SSR, Institut Fiziologii i Eksperimental'noi Patologii Aridnoi Zony, Ashkhabad, Turkmen SSR) *Gigiena Truda i Professional'nye Zabolevanii* (ISSN 0016-9919), Oct. 1984, p. 50, 51. In Russian.

A85-23220

THE SYNCOPAL STATE ASSOCIATED WITH MODERATE CRANIOCEREBRAL TRAUMA [OBMOROCHNYE SOSTOIANIIA PRI LEGKOI CHEREPNO-MOZGOVOI TRAVME]

L. V. STAKHOVSKAIA (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) *Sovetskaia Meditsina*, no. 10, 1984, p. 16-19. In Russian. refs

52 AEROSPACE MEDICINE

A85-23221

SEVERE RENAL INSUFFICIENCY DUE TO HYPERURICEMIA AND URATE NEPHROLITHIASIS [OSTRAIA POCHECHNAIA NEDOSTATOCHNOST' PRI GIPERURIKEMII I MOCHEKISLOM NEFROLITIAZE]

M. D. DZHAVAD-ZADE and M. M. AGAEV (Azerbaidzhanskii Gosudarstvennyi Institut Usovershenstvovaniia Vrachei, Baku, Azerbaidzhansk SSR) Sovetskaia Meditsina, no. 10, 1984, p. 32-26. In Russian. refs

A85-23222

COMPUTER TOMOGRAPHY OF ALVEOCOCCOSIS IN THE LIVER [KOMP'IUTERNAIA TOMOGRAFIIA PRI AL'VEOKOKKOZE PECHENI]

G. P. FILIMONOV, N. I. TUMOLSKAIA, and R. N. GARIBASHVILI (I Moskovskii Meditsinskii Institut, Moscow, USSR) Sovetskaia Meditsina, no. 10, 1984, p. 40-44. In Russian. refs

A85-23223

HEMATOLOGICAL COMPLICATIONS OF DRUG THERAPY [GEMATOLOGICHESKIE OSLOZHNIENIA LEKARSTVENNOI TERAPII]

A. N. KUDRIN and T. A. ZATSEPILOVA (I Moskovskii Meditsinskii Institut, Moscow, USSR) Sovetskaia Meditsina, no. 10, 1984, p. 45-48. In Russian. refs

Hematological complications most frequently encountered during the administration of drugs are examined, with attention given to anemias, leukopenia, thrombocytopenia, and leukosis. Emphasis is placed on two types of anemia: (1) anemia (mainly hereditary) due to a deficiency of enzymes in the erythrocytes; and (2) anemia developing as a result of the direct toxic effect of drugs on the erythrocytes.

B.J.

A85-23230

A COMPLEX METHOD FOR EVALUATING THE COLOR VISION OF PATIENTS WITH LOCALIZED CEREBRAL LESIONS [KOMPLEKSNAIA METODIKA OTSENKI TSVETOVOGO ZRENIIA U BOL'NYKH S LOKAL'NYMI PORAZHENIAMI GOLOVNOGO MOZGA]

E. A. FEDOROVSKAIA Voprosy Psichologii (ISSN 0042-8841), Sept.-Oct. 1984, p. 148, 149. In Russian. refs

A85-23236

THE STRUCTURAL CHARACTERISTICS OF THE METACARPAL BONES OF ATHLETES PRACTISING A VARIETY OF SPORTS [OSOBEENNOSTI STROENIIA PIASTNYKH KOSTEI SPORTSMENOV RAZNYKH SPETSIALIZATSII]

E. N. KOMISSAROVA (Leningradskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Leningrad, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, Oct. 1984, p. 35-39. In Russian. refs

A85-23238

THE RELIEF CHARACTERISTICS OF THE INTERNAL SURFACE OF THE CARDIAC VENTRICLES AND VIESSEN-THEBESIAN VESSELS [OSOBEENNOSTI REL'EFA VNUTRENNEI POVERKHNOSTI ZHELUDOCHKOV SERDTSA I 'SOSUDY V'ESSENA-TEBEZIIA']

E. A. ADYSHIRIN-ZADE and L. I. GABAIN (Kuibyshevskii Meditsinskii Institut, Kuibyshev, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, Oct. 1984, p. 54-59. In Russian. refs

A85-23239

THE MORPHOFUNCTIONAL CHARACTERISTICS OF INTRAORGAN ARTERIAL VESSELS IN THE KIDNEY IN THE NORMAL STATE AND IN CERTAIN CARDIOVASCULAR DISEASES [MORFOFUNKTSIONAL'NAIA KHARAKTERISTIKA INTRAORGANNYKH ARTERIAL'NYKH SOSUDOV POCHEK V NORME I PRI NEKOTORYKH SERDECHNO-SOSUDISTYKH ZABOLEVANIYAKH]

O. A. KAPLUNOVA and A. V. SOKOVSEVA (Rostovskii Meditsinskii Institut, Rostov-on-Don, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, Oct. 1984, p. 64-70. In Russian. refs

A85-23240

SIGNIFICANCE OF ULTRASONIC ECHO STUDIES FOR HUMAN ANATOMY [ZNACHENIE UL'TRAZVUKOVOI EKHOLOKATSII Dlia ANATOMII CHELOVEKA]

M. G. PRIVES, A. K. KOSOUROV, and A. P. KARPOV (I Leningradskii Meditsinskii Institut, Leningrad, USSR) Arkhiv Anatomii, Gistologii i Embriologii (ISSN 0004-1947), vol. 87, Oct. 1984, p. 87-89. In Russian. refs

A85-23246

SCINTIGRAPHY AND EMISSION COMPUTER TOMOGRAPHY OF THE HEAD IN THE DIAGNOSIS OF INTRACRANIAL VASCULAR CONGESTION [STSINTIGRAFIIA I EMISSIONNAIA KOMP'IUTERNAIA TOMOGRAFIIA GOLOVY V DIAGNOSTIKE VNUTRICHEREPNOGO VENOZNOGO ZASTOIA]

V. B. SERGIENKO, V. V. UVAROV, and N. V. BABENKOV Zhurnal Nevropatologii i Psichiatrii im. S. S. Korsakova (ISSN 0044-4588), vol. 84, 1984, p. 1281-1287. In Russian. refs

A85-23247

THE STATE OF THE CENTRAL AND CEREBRAL HEMODYNAMICS IN NORMAL SUBJECTS AND IN PATIENTS WITH INCIPIENT CEREBRAL CIRCULATION INSUFFICIENCY [SOSTOIANIE TSENTRAL'NOGO I TSEREBRAL'NOGO KROOOBRASHCHENIIA U ZDOROVYKH I BOL'NYKH S NACHAL'NYMI PROIAVLENIIAMI NEDOSTATOCHNOSTI KROVONABZHENIIA MOZGA]

S. M. VINICHUK (Kievskii Meditsinskii Institut, Kiev, Ukrainian SSR) Zhurnal Nevropatologii i Psichiatrii im. S. S. Korsakova (ISSN 0044-4588), vol. 84, 1984, p. 1294-1300. In Russian. refs

A85-23248

THE HEMODYNAMICS OF VARIOUS STAGES OF NIGHTTIME SLEEP IN PATIENTS WITH PRELIMINARY SYMPTOMS OF CEREBRAL HEMODYNAMIC DEFICIENCY [NOCHNOI SON I TSEREBRAL'NAIA GEMODINAMIKA V RAZLICHNYKH EGO STADIAKH I TSIKLAKH U BOL'NYKH S RANNIM I PROIAVLENIIAMI NEDOSTATOCHNOSTI MOZGOVOGO KROOOBRASHCHENIIA]

P. V. VOLOSHIN, V. S. MERTSALOV, and N. V. IGNATOVA (Khar'kovskii Nauchno-Issledovatel'skii Institut Nevrologii i Psichiatrii, Kharkov, Ukrainian SSR) Zhurnal Nevropatologii i Psichiatrii im. S. S. Korsakova (ISSN 0044-4588), vol. 84, 1984, p. 1316-1321. In Russian. refs

A85-23249

CLIMATOLOGICAL ASPECT OF THE EPIDEMIOLOGY OF ACUTE DISTURBANCES OF BRAIN CIRCULATION (REVIEW) [KLIMATOLOGICHESKII ASPEKT EPIDEMIOLOGII OSTRYKH NARUSHENII MOZGOVOGO KROOOBRASHCHENIIA /OBZOR/]

V. L. FEIGIN Zhurnal Nevropatologii i Psichiatrii im. S. S. Korsakova (ISSN 0044-4588), vol. 84, 1984, p. 1406-1412. In Russian. refs

A85-23251

STRUCTURAL STUDIES OF HUMAN IGA1 AND IGA2 IMMUNOGLOBULINS TAGGED WITH TWO DIFFERENT SPIN-LABELS [STRUKTURNYE ISSLEDOVANIIA IGA1 I IGA2 IMMUNOGLOBULINOV CHELOVEKA, MECHENNYKH DVUMIA RAZLICHNYMI SPIN-METKAMI]

IU. K. SYKULEV, R. S. NEZLIN, G. P. GERMAN, E. V. CHERNOKHOSTOVA, and V. V. LAVRENTEV (Akademii Nauk SSSR, Institut Molekularnoi Biologii; II Moskovskii Gosudarstvennyi Meditsinskii Institut; Moskovskii Nauchno-Issledovatel'skii Institut Epidemiologii i Mikrobiologii, Moscow, USSR) *Biofizika* (ISSN 0006-3029), vol. 29, Sept.-Oct. 1984, p. 744-748. In Russian. refs

A85-23255

A SIMULATION OF THE REGIONAL DEPOSITION OF AIR IONS IN HUMAN LUNGS [MODELIROVANIE REGIONAL'NOGO OSAZHDENIIA AEROIONOV V LEGKIH CHELOVEKA]

F. G. PORTNOV, S. E. FAKKENSHTEIN, and A. B. SHMIDT *Biofizika* (ISSN 0006-3029), vol. 29, Sept.-Oct. 1984, p. 883-885. In Russian. refs

A85-23260

TEMPORARY ENDOCARDIAL ELECTROCARDIOSTIMULATION DURING DISTURBANCES OF HEART RHYTHM AND CONDUCTION [VREMENNAYA ENDOKARDIAL'NAIA ELEKTROKARDIOSTIMULATSIIA PRI NARUSHENIIAKH SERDECHNOGO RITMA I PROVODIMOSTI]

V. N. MALYGIN, A. A. MATSNEV, and V. G. TARASOV *Voenno-Meditsinskii Zhurnal* (ISSN 0026-9050), Oct. 1984, p. 28-32. In Russian.

A85-23261

EFFICIENCY OF THE ELEUTHEROCOCCUS TREATMENT OF ENURESIS [EFFEKTIVNOST' LECHENIIA ENUREZA ELEUTEROKOKKOM]

R. CHENKOV *Voenno-Meditsinskii Zhurnal* (ISSN 0026-9050), Oct. 1984, p. 60. In Russian.

A85-23262

AMPLITUDE CHARACTERISTICS OF THE ELECTRIC FIELD OF THE HEART [AMPLITUDNAIA KHARAKTERISTIKA ELEKTRICHESKOGO POLIA SERDTSA]

N. A. ANDREICHEV, D. K. KHODZHAeva, and A. S. GALIAVICH (Kazanskii Meditsinskii Institut, Kazan, USSR) *Kazanskii Meditsinskii Zhurnal*, vol. 65, Sept.-Oct. 1984, p. 347-350. In Russian.

A85-23263

ENDOCRINE STRUCTURE OF THE KIDNEYS IN HYPERTENSIVE DISEASE [ENDOKRINNYYE STRUKTURY POCHKI PRI GIPERTONICHESKOI BOLEZNI]

B. N. TSIBEL (Irkutskii Meditsinskii Institut, Irkutsk, USSR) and L. S. KHODASEVICH (Severodvinskaiia Gorodskaiia Bol'nitsa No. 1, Severodvinsk, USSR) *Arkhiv Patologii* (ISSN 0004-1955), vol. 46, no. 9, 1984, p. 62-68. In Russian. refs

A comparative morphometric analysis of the juxtaglomerular complex and interstitial cells of the cortico-medullary zone in the kidneys has been performed, using autopsy material from 41 cases of mild and severe hypertension. The functional state of the intrarenal arteries and arterioles, and the degree of medullar interstitium sclerosis were each taken into account in the analysis. In tissue samples from cases of mild hypertension, no activation of the renin-producing mechanisms was observed, while pronounced activation was observed in samples from the severe hypertension cases. It is suggested that the mesangial cells produce a reserve of renin in cases of hypertension. The prostaglandin synthesis function of interstitial cells was not impaired by mild hypertension, but was significantly impaired by severe hypertension. The relationship between the degree of impairment in renal arteries and arterioles and the degree of medullar sclerosis in cases of severe hypertension is discussed. I.H.

A85-23264

THE AGE-RELATED ASPECTS OF VESTIBULAR FUNCTION IN PATIENTS WITH CHRONIC PURULENT OTITIS MEDIA ACCORDING TO CUPULOMETRY DATA [VOZRASTNYE OSOBNOSTI VESTIBULIARNOI FUNKTSII BOL'NYKH KHRONICHESKIM GNOINYM SREDNIM OTITOM PO DANNYM KUPULOMETRII]

A. F. PATRIN and L. A. LUCHIKHIN (II Moskovskii Gosudarstvennyi Meditsinskii Institut, Moscow, USSR) *Vestnik Otorinolaringologii* (ISSN 0042-4668), Nov.-Dec. 1984, p. 37-40. In Russian. refs

A85-23265

AN INVESTIGATION OF THE CEREBRAL HEMODYNAMICS OF WORKERS EXPOSED TO INDUSTRIAL NOISE [ISSLEDOVANIE GEMODINAMIKI GOLOVNOGO MOZGA U RABOTAIUSHCHIKH V USLOVIIAKH PROIZVODSTVENNOGO SHUMA]

M. A. SHUSTER, I. M. KAEVITSER, A. N. CHKANNIKOV, and A. A. DOVGAILO (Moskovskii Oblastnoi Nauchno-Issledovatel'skii Klinicheskii Institut, Moscow, USSR) *Vestnik Otorinolaringologii* (ISSN 0042-4668), Nov.-Dec. 1984, p. 51-54. In Russian. refs

The cerebral and peripheral blood circulation of 62 female textile workers was studied in response to industrial noise levels from 94 to 103 dB. The examination procedures used to measure circulation included rheoencephalography, segmental tachosillography, and phonotachosillography. A zero level of hearing impairment was observed in 25 workers, while first and second degree impairments were observed in 15, and 14 workers, respectively. Third degree hearing impairments were observed in 8 workers. Age-related variations in the rheoencephalograms were recorded and compared with baseline data for each age group. It is found that blood content in the brain increased in the early stages of noise-induced illness, while the blood content in the vertibrobasilar region remained normal for each age group. The rheoencephalographic and elasticity index of the medium-sized and small cerebral arteries fell below the average baseline in patients with third degree hearing impairments. On the basis of the clinical data, it is suggested that the initial increase in the blood content of the cerebral hemispheres may be a compensatory response to prolonged exposure to loud industrial noise. I.H.

A85-23271

EXPERIENCE WITH THE EARLY DIAGNOSIS AND PREVENTION OF THE VIBRATION SICKNESS OF CONSTRUCTION WORKERS [OPYT RANNEI DIAGNOSTIKI I PROFILAKTIKI VIBRATSIONNYKH ZABOLEVANII RABOCHIKH-STROITELEI]

T. L. KUIMOVA and V. A. FESENKO (Novosibirskii Inzhenerno-Stroitel'nyi Institut, Novosibirsk, USSR) *Gigiena i Sanitariia* (ISSN 0016-9900), Oct. 1984, p. 74, 75. In Russian.

A85-23274

CARBOHYDRATE METABOLISM AND ACID-BASE EQUILIBRIUM IN RELATION TO NUTRITION IN PERSONS PERFORMING PHYSICAL AND MENTAL WORK IN THE ESTONIAN SSR [OB UGLEVODNOM OBMENE I KISLOTNO-SCHELOCHNOM RAVNOVESII V ZAVISIMOSTI OT PITANIIA U LITS FIZICHESKOGO I UMSTVENNOGO TRUDA V ESTONSKOI SSR]

V. M. PAUTS (Ministerstvo Zdravookhraneniia Estonskoi SSR, Institut Eksperimental'noi i Klinicheskoi Meditsiny, Tallin, Estonian SSR) *Voprosy Pitaniia* (ISSN 0042-8833), Sept.-Oct. 1984, p. 19-21. In Russian. refs

A85-23292

ALCOHOL DEHYDROGENASE IN THE BLOOD SERUM OF HEALTHY PERSONS AND OF PATIENTS WITH CHRONIC ALCOHOLISM [ALKOGOL'DEGIDROGENAZA SYVOROTKI KROVI ZDOROVYKH LIUDEI I BOL'NYKH KHRONICHESKIM ALKOGOLIZMOM]

M. S. USATENKO, M. A. FEDURINA, I. V. BOIKII, and IU. S. BORODIN (Akademiiia Meditsinskikh Nauk SSSR, Institut Eksperimental'noi Meditsiny; Nauchno-Issledovatel'skii Psikhoneurologicheskii Institut, Leningrad, USSR) Voprosy Meditsinskoi Khimii (ISSN 0042-8809), vol. 30, Sept.-Oct. 1984, p. 33-37. In Russian. refs

A85-23296

INVESTIGATION OF THE TOTAL ACTIVITY AND DISTRIBUTION OF MULTIPLE FORMS OF A NUMBER OF LYSOSOMAL GLYCOSIDASES IN SUBFRACTION OF HUMAN LEUKOCYTES [ISSLEDOVANIE OBUHCHEI AKTIVNOSTI I RASPREDELENIIA MNOZHESTVENNYKH FORM RIADA LIZOSOMNYKH GLIKOZIDAZ V SUBFRAKTSIIAKH LEIKOTSITOV KROVI CHELOVEKA]

N. A. KUZMICHEVA and G. IA. VIDERSHAIN (Akademiiia Meditsinskikh Nauk SSSR, Institut Biologicheskoi i Meditsinskoi Khimii, Moscow, USSR) Voprosy Meditsinskoi Khimii (ISSN 0042-8809), vol. 30, Sept.-Oct. 1984, p. 76-81. In Russian. refs

A85-23299

AN EVALUATION OF THE EFFECTIVENESS OF TREATMENT BASED ON SURVIVAL RATE TABLES [OTSENKA EFFEKTIVNOSTI LECHENIIA NA OSNOVE TABLITS DOZHITIIA]

D. M. MALINSKII (Voenno-Meditsinskaia Akademiiia, Leningrad, USSR) Sovetskoe Zdravookhranenie (ISSN 0038-5239), no. 10, 1984, p. 26-31. In Russian. refs

The use of survival rate tables for evaluating the efficacy of various medical treatments is discussed. It is pointed out that in order to obtain the most reliable indices of clinical efficacy, the actual life span of all patients in the data set should be taken into account. Merkov's (1974) algorithm for the extrapolation of background data from 40-60 patients is recommended to fill in the tables. A criterion is offered for comparing the medical efficacy parameters of two groups of patients, based on the survival rate tables. I.H.

A85-23300

ORGANIZATION AND EFFICIENCY OF A TEAM-BASIS METHOD FOR THE PROPHYLACTIC ULTRAVIOLET IRRADIATION OF COAL MINERS [ORGANIZATSIIA I EFFEKTIVNOST' BRIGADNOGO METODA PROFILAKTICHESKOGO UL'TRAFIOLETOVOGO OBLUCHENIIA GORNORABOCHIKH UGOL'NYKH SHAKHT]

V. A. SVETLICHNYI and A. A. RUBTSOV (Gorlovskia Gorodskiaia Sanepidstantsiia, Gorlovka, Ukrainian SSR) Sovetskoe Zdravookhranenie (ISSN 0038-5239), no. 10, 1984, p. 40-42. In Russian.

A85-23306

PROSPECTS FOR THE USE OF MODELS OF AUTOREGRESSION-SLIDING MEAN TYPE FOR EEG ANALYSIS [PERSPEKTIIVY PRIMENENIIA MODELEI TIPA AVTOREGRESSII-SKOL'ZIASHCHEGO SREDNEGO Dlia ANALIZA EEG]

E. A. ZHIRMUNSKAIA, P. N. DUBNER, and S. R. GUTMAN (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Avtomatizatsii Upravleniya v Nefromyshlennoi Sfere, Moscow, USSR) Uspekhi Fiziologicheskikh Nauk (ISSN 0301-1798), vol. 15, Oct.-Dec. 1984, p. 6-22. In Russian. refs

A85-23309

SPECIFIC GLUCOCORTICOID RECEPTORS OF HUMAN MUSCLE CYTOSOL [SPETSIFICHESKIE GLIUKOKORTIKOIDNYE RETSEPTORY TSITOZOLIA MYSHTSY CHELOVEKA]

P. P. GOLIKOV (Nauchno-Issledovatel'skii Institut Skoroi Pomoshchi, Moscow, USSR) Problemy Endokrinologii, vol. 30, Sept.-Oct. 1984, p. 46-49. In Russian. refs

A85-23311

WAYS TO ENHANCE THE EFFICIENCY OF THE CORRECTION OF HYPOXIC STATES [SHLIAKHI PIDVISHCHENNIA EFEKTIVNOSTI KOREKTSII GIPOKSICHNIKH STANIV]

M. M. SEREDENKO, V. A. TSIRULNIKOV, L. I. ZHUKOVSKII, N. V. PARKHOMENKO, I. B. BRUSHKO, V. P. POZHAROV, K. V. ROZOVA, and L. D. FESENKO Akademiiia Nauk Ukrains'koi RSR, Visnik (ISSN 0372-6436), vol. 48, Oct. 1984, p. 38-50. In Ukrainian. refs

Studies were performed on 25 patients with bronchial asthma with obstructive respiratory deficiency (ORD) and 20 patients with sarcoidosis of the lungs with restrictive and mixed types of respiratory deficiency. A normobaric hyperoxic helium-oxygen mixture was found to be effective in removing arterial hypoxemia and normalizing the oxygen-transport function of the blood in patients with chronic lung diseases (i.e., ORD); this mixture provides an oxygen balance for the organism in an efficient and economical way. This mixture is less effective, however, in patients with restrictive and mixed types of ventilation disorders; in addition to this mixture, a hyperoxic nitrogen-oxygen mixture should be used.

B.J.

A85-23312

MECHANISM FOR THE INCREASE OF ARTERIAL PRESSURE IN A STATE OF REST AND DURING PHYSICAL EXERCISE IN PATIENTS WITH HYPERTENSION [K MEKHANIZMU POVYSHENIIA ARTERIAL'NOGO DAVLENIIA V POKOE I PRI FIZICHESKOI NAGRUZKE U BAL'NYKH GIPERTONICHESKOI BOLEZN'IU]

A. S. DZHUMAGULOVA (Kirgizskii Nauchno-Issledovatel'skii Institut Kardiologii, Kirgiz SSR) Zdravookhranenie Kirgizii, Sept.-Oct. 1984, p. 22-29. In Russian.

The relationship between blood minute volume (BMV) and total peripheral vascular resistance (TPVR) in a state of rest and under submaximal physical load (SPL) was investigated in 110 patients with hypertension and 36 healthy persons. In a state of rest, the mechanism responsible for increase of arterial pressure in patients with hypertension was associated with a rise of BMV indices above normal levels for a given TPVR. A pronounced pressor response to SPL was observed in patients with hypertension, which indicated a decorrelation between BMV and TPVR, increasing as the hypertension became worse.

B.J.

A85-25618

DROP IN NERVOUS-SYSTEM LOAD AS A RISK FACTOR IN THE DEVELOPMENT OF MYOCARDIAL INFARCTION [SPAD NERVNOI NAGRUZKI KAK FAKTOR RISKA RAZVITIIA INFARKTA MIOKARDIA]

G. A. VSELIUBSKI and V. I. GUREVICH Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Dec. 1984, p. 35-37. In Russian.

The significance of various random risk factors in the development of myocardial infarction is evaluated for 80 male patients 30 to 70 years of age. It is found that a drop in the load on the nervous system is a major random risk factor. The period of a drastic drop in nervous-system load is found to be more dangerous in terms of causing myocardial infarction than the period of heightened load itself. It is concluded that this situation should be taken into account in developing prevention measures for myocardial infarction.

B.J.

A85-25619

PROMISING METHODS FOR EARLY LABORATORY DIAGNOSIS OF INFECTIOUS DISEASES [PERSPEKTIVNYE METODY RANNEI LABORATORNOI DIAGNOSTIKI INFEKTSIONNYKH ZABOLEVANII]

V. A. LEBEDINSKII, V. V. MERETSKOV, N. S. GARIN, and V. S. SMIRNOV Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Dec. 1984, p. 38-40. In Russian.

Methods for assessing the quantitative and functional characteristics of immunocompetent cells are examined which are specific with respect to protective antigens or allergens. Particular consideration is given to the skin allergy test; methods for determining the amount of protective antigens of binding cells; the lymphocyte blast transformation response induced by a specific antigen or allergen, exciting an infectious disease; the leukocyte-migration-slowdown response induced by a specific antigen or allergen, exciting an infectious disease; and the determination of the neutrophil-damage index. B.J.

A85-25620

PREVENTION MEASURES FOR THE ADVERSE EFFECTS OF VIBRATION [O MERAKH PROFILAKTIKI NEBLAGOPRIATNOGO VOZDEISTVIIA VIBRATSII]

V. V. IVANOV and S. D. MIGACHEV Voenno-Meditsinskii Zhurnal (ISSN 0026-9050), Dec. 1984, p. 47, 48. In Russian. refs

Measures for preventing the adverse effects of vibration in flight personnel are briefly described. Particular attention is given to methods for enhancing the static endurance of various muscles (including weight lifting), massage and water treatments, and the administration of vitamins. B.J.

A85-25643

THE VARIABILITY OF FUNCTIONAL SYSTEM STRUCTURE DURING PHYSICAL ACTIVITY AND IN THE PRESENCE OF FATIGUE [O VARIATIVNOSTI STRUKTURY FUNKTSIONAL'NOI SISTEMY V PROTSESSSE DEIATEL'NOSTI I PRI UTOMLENII]

N. V. ZIMKIN (Leningradskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 70, Dec. 1984, p. 1593-1599. In Russian. refs

A number of experimental investigations of the physiological factors associated with the variability of functional system structure are reviewed, with emphasis given to the efferent component of functional systems. It is shown that variability can affect the structure of repeated cyclic movements in work activities of the same level of energy, as well as different movements. The problem of variability of functional systems in conditions of fatigue is also discussed. I.H.

A85-25645

THE INTEGRATION OF MOTOR AND VEGETATIVE FUNCTIONS DURING MUSCULAR WORK [INTEGRATSIIA DVIGATEL'NYKH I VEGETATIVNYKH FUNKTSII PRI MYSHECHNOI RABOTE]

A. B. GANDELSMAN, T. A. EVDOKIMOVA, V. V. KIM, V. P. PONOMAREV, and M. A. SHANSKOV (Leningradskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 70, Dec. 1984, p. 1611-1616. In Russian. refs

The integration of motor and vegetative functions (respiration, circulation) in 78 athletes was investigated in biomechanical muscle-loading experiments in laboratory conditions and during athletic activity. It is found that the low level of energy expenditure characteristic of isometric exercise was associated with inadequate increases in heart rate and blood pressure. In subjects exposed to dynamic cyclic loading, increases in heart rate and blood pressure were closely related to the level of O₂ consumption and systolic indices. Voluntary muscular relaxation during cyclic loading was associated with low rates of O₂ consumption and contractile frequency, and with low heart rates and blood pressure. During cyclic and noncyclic motor activity, the character of the integration of motor and vegetative functions is determined by the relative difficulty of each biomechanical regime. I.H.

A85-25646

THE DYNAMICS OF AN EXTREMELY SLOW OMEGA-POTENTIAL AND EEG SPATIAL SYNCHRONIZATION IN THE PRESENCE OF MUSCLE FATIGUE [DINAMIKA SVERKHMEDLENNOGO OMEGA-POTENTSIALA I PROSTRANSTVENNOI SINKHRONIZATSII EEG PRI MYSHECHNOM UTOMLENII]

E. B. SOLOGUB, T. N. TSONEVA, Iu. A. PETROV, O. G. PAVLOV, and T. V. DAKHAB (Leningradskii Gosudarstvennyi Institut Fizicheskoi Kul'tury, Leningrad, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 70, Dec. 1984, p. 1617-1623. In Russian. refs

The dynamics of an extremely slow omega-potential and EEG activity in adolescent and adult athletes was investigated during strenuous exercise on a cycle ergometer. Analysis of the EEG data showed that the synchronization of omega-potentials and the phase readjustment of the EEG prefrontal and precentral cortices was increased during the initial stage of the development of muscle fatigue. The degree of the increase varied with respect to the age of the subject and to improvements in athletic ability. It is concluded that a reliable correlation exists between slow omega-potential and EEG spatial synchronization. I.H.

A85-25648

MAXIMAL BLOOD-CIRCULATION MODES [MAKSIMAL'NYE REZHIMY KROVOOBRAZHENIIA]

V. L. KARPMAN (Gosudarstvennyi Tsentral'nyi Institut Fizicheskoi Kul'tury, Moscow, USSR) Fiziologicheskii Zhurnal SSSR (ISSN 0015-329X), vol. 70, Dec. 1984, p. 1645-1650. In Russian. refs

The characteristics of three different modes of blood-circulation were investigated experimentally in 44 athletes during strenuous exercise on a cycle ergometer. The three circulation modes included an optimal mode, a reduced mode, and an excessive mode. In the optimal mode, real blood minute volume of 33.55 (+ or - 2.21) l/min was measured, and the O₂ consumption rate was 5.24 (+ or - 0.49) l/min. In the excessive mode, blood minute volume and the O₂ consumption rate were 5.34 (+ or - 0.86) l/min and 37.72 (+ or - 2.89) l/min, respectively. In the reduced mode, relatively small values for blood minute volume were found, on the average of 29.76 (+ or - 1.64). The difference between arterial and venous levels of oxygen content was small in the excessive mode in comparison with the reduced mode. It is shown that the increase in the development of one or another circulation type was related to the individual blood volume velocity: in subjects with high blood minute volume, O₂ transfer from capillaries was limited by blood flow; patients with low minute blood volume had a faster rate of O₂ extraction from muscle tissue, and larger differences between venous and arterial O₂ levels. I.H.

A85-25702

MUSCLE AND FEMORAL VEIN TEMPERATURES DURING SHORT-TERM MAXIMAL EXERCISE IN HEART FAILURE

F. G. SHELLOCK, H. J. C. SWAN, and S. A. RUBIN (California, University, Los Angeles, CA) Journal of Applied Physiology (ISSN 0161-7567), vol. 58, Feb. 1985, p. 400-408. refs
(Contract NIH-HL-0738-05)

Muscle and femoral vein temperatures were measured in eight patients with severe heart failure during incremental bicycle exercise. Measurements were obtained for pulmonary blood (core) and skin temperature, and were compared with measurements for a group of normal subjects. It is found that the resting core temperature of the heart failure patients decreased to 36.57 (+ or - 0.40) C following 10 minutes of exercise. Femoral temperatures in the heart patients were below core temperatures, and muscle temperatures were significantly lower than in the normal subjects. Some possible mechanisms for the temperature changes are discussed. I.H.

A85-25703

CHRONIC EXERCISE AND LEFT VENTRICULAR STRUCTURE AND FUNCTION IN HEALTHY HUMAN SUBJECTS

L. A. WOLFE, R. P. MARTIN, D. D. WATSON, R. D. LASLEY, and D. E. BRUNS (Queen's University, Kingston, Ontario, Canada; Virginia, University, Charlottesville, VA) *Journal of Applied Physiology* (ISSN 0161-7567), vol. 58, Feb. 1985, p. 409-415. Research supported by the University of Virginia. refs

Twelve healthy well-trained participants in a supervised exercise program (mean age, 41.3 yr) were compared with 12 sedentary control subjects (mean age, 38.9 yr) with physical characteristics similar to the exercised group (EG) before training. Resting echocardiograms revealed significantly lower heart rates (HR) in the EG compared with control group (CG) but no evidence for cardiac structural differences between groups. Radionuclide angiograms performed at rest and during two levels of supine cycling (HR targets: 120 and 140 beats/min) resulted in increases in background-corrected end-diastolic counts and confirmed use of the Frank-Starling mechanism in the majority of subjects. The results suggested that fitness training does not induce significant cardiac enlargement as apparent from measurements at rest or important changes in contractile state during exercise. Increases in exercise stroke volume with such training may be the result of an increased end-diastolic volume. Author

A85-25704

CENTRAL CONTROL OF CARDIOVASCULAR ADJUSTMENTS TO EXERCISE

A. PERSKI (National Institute for Psychosocial Factors and Health, Stockholm, Sweden; National Institutes of Health, Baltimore, MD), S. P. TZANKOFF (Marshall University, Huntington, WV; National Institutes of Health, Baltimore MD), and B. T. ENGEL (National Institutes of Health, Baltimore, MD) *Journal of Applied Physiology* (ISSN 0161-7567), vol. 58, Feb. 1985, p. 431-435. refs

Voluntary heart rate (HR) control during bicycle ergometer exercise was studied in 10 normal male subjects. It is shown that subjects could learn to attenuate the tachycardia of exercise while exercising at a steady work level of 60-70 percent of maximum HR. Subjects who viewed beat-to-beat displays of HR and were instructed to slow HR showed 22 percent less increase in HR than a control group. When the control subjects also participated, similar decreases in HR were observed. Analysis of concomitant respiratory and metabolic data showed that HR attenuation was accompanied by decreased O₂ consumption and pulmonary ventilation. Comparison of presubmaximal and postsubmaximal cardiovascular pulmonary and humoral response showed that the improvement of cardiovascular function during feedback training occurred with no sacrifice to working muscle requirements. The complete experimental data are given in a table. I.H.

A85-25824

ELECTRICAL SOURCES IN HUMAN SOMATOSENSORY CORTEX IDENTIFICATION BY COMBINED MAGNETIC AND POTENTIAL RECORDINGS

C. C. WOOD, T. ALLISON (U.S. Veterans Administration, Medical Center, West Haven; Yale University, New Haven, CT), D. COHEN, B. N. CUFFIN (MIT, Cambridge, MA), and M. YARITA (Nihon Kohden Co., Tokyo, Japan) *Science* (ISSN 0036-8075), vol. 227, March 1, 1985, p. 1051-1053. Research supported by the U.S. Veterans Administration. refs

(Contract NSC PCM-81-19973; PHS-NS-19558; PHS-MH-05286)

Magnetic fields and electrical potentials produced by neuronal activity have different properties that can be used for the identification of electrical sources in the human brain. Fields and potentials occurring 20 to 30 milliseconds after median nerve stimulation in human subjects were compared in order to investigate the sources of evoked potential components that have been attributed by different investigators to the thalamus or thalamocortical afferents, to separate radial sources in somatosensory cortex and motor cortex, or to a tangential source in somatosensory cortex. The magnetic and potential wave forms were highly similar in morphology, and their spatial distributions were centered over sensorimotor cortex, were dipolar in shape,

and differed in orientation by approximately 90 degrees; distances between the minimum and maximum of the magnetic distributions were about 60 percent of those of the potential distributions. These results cannot be accounted for by thalamic sources or radial cortical sources alone, but are consistent with a tangential source in somatosensory cortex, with an additional smaller contribution from radial sources. Author

A85-26259

AN ESTIMATE OF THE EFFICIENCY OF INTRAPULMONARY GAS EXCHANGE DURING MUSCULAR WORK IN HYPOXIC CONDITIONS [OTSENKA EFFEKTIVNOSTI VNUTRILEGOCHNOGO GAZOOBMENA PRI MYSHECHNOI RABOTE V USLOVIIAKH GIPOKSICHESKOI GIPOKSI]

V. P. NIZOVTEV and L. F. ZVARICH (Kuibyshevskii Meditsinskii Institut, Kuibyshev, USSR) *Fiziologicheskii Zhurnal* (Kiev) (ISSN 0201-8489), vol. 30, July-Aug. 1984, p. 494-498. In Russian. refs

The process of gas exchange in the lungs during muscular work in hypoxic conditions has been investigated experimentally. Gas exchange was determined by measurements of oxygen pressure (PaO₂) and carbon dioxide pressure (PaCO₂) in arterialized capillary blood. The experimental data are given in a series of tables. Interrelationships between variations in gas exchange, the duration of muscular loading, and the effects of the hypoxic air mixture are described in a nomogram. I.H.

A85-26260

THE FUNCTION OF THE ADRENAL CORTEX AND THE OVARIES IN NORMAL SUBJECTS AND IN PATIENTS WITH IRON DEFICIENCY ANEMIA FROM AN ARID REGION DURING ADAPTATION TO MOUNTAIN CONDITIONS [FUNKTSIIA KORY NADPOCHECHNIKOV I IAICHNIKOV U ZDOROVYKH I BOL'NYKH ZHELEZODEFITSITNOI ANEMLEI ZHITELEI ARIDNOI ZONY PRI ADAPTATSII K USLOVIIAM GOR]

A. G. REZNIKOV, I. S. CHELNAKOVA, T. P. BEZVERKHAIA, L. A. REZNIKOVA, P. V. BELOSHITSKII, and V. S. MINAKOV (Kievskii Institut Endokrinologii i Obmena Veshchestv; Akademii Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) *Fiziologicheskii Zhurnal* (Kiev) (ISSN 0201-8489), vol. 30, July-Aug. 1984, p. 498-502. In Russian. refs

A85-26296

A MODEL OF A CONSTANT COLOR PERCEPTION PATTERN FOR THE CASE OF CONTINUOUS SPECTRAL FUNCTIONS [MODEL' KONSTANTNOSTI TSVETOVOSPRIATIIA Dlia SLUCHAIA NEPRERYVNYKH SPEKTRAL'NYKH FUNKTSII]

P. P. NIKOLAEV (Akademii Nauk SSSR, Institut Problem Peredachi Informatsii, Moscow, USSR) *Biofizika* (ISSN 0006-3029), vol. 30, Jan.-Feb. 1985, p. 112-117. In Russian. refs

A trichromatic model is proposed for the constant color perception pattern (MCPCP) in scenes with a single illumination source. Approximate functions are derived for source emission, surface reflection and photodetector sensitivity, on the basis of conventional Gaussian distribution curves. The color perception parameters of 'color tone', 'cleanliness', and 'lightness' are used to organize color perception in the model to correspond to a human pattern. A special calorimetric process in the MCPCP is employed to estimate the color of a visual stimulus, and the respective efficiencies of two spectral information processing algorithms in the MCPCP are compared. I.H.

N85-17988# Naval Training Equipment Center, Orlando, Fla. **SIMULATOR SICKNESS: SENSORIMOTOR DISTURBANCES INDUCED IN FLIGHT SIMULATORS**

L. H. FRANK, R. S. KENNEDY, M. E. MCCUALEY, R. W. ROOT, and R. S. KELLOGG *In AF Human Resources Lab. The IMAGE 3 Conf. Proc.* p 417-426 Sep. 1984 (AD-P004334) Avail: NTIS HC A22/MF A01 CSCL 06S

If sickness occurs in the simulator, but not in the real world, there is evidence of a bad simulation. We reviewed the available data on simulator sickness in terms of their incidence, etiology, and contributing factors. It was found that psychophysiological

disturbances can occur during simulator flight, continue several hours post flight, or be delayed. Effects were found in both motion base and fixed base simulators, to pilots, other aircraf, and instructors. Simulator sickness may lead to decreased simulator use, distrust of the training received, and post effects which may place the individual at risk in real life situations such as driving a car. Adaptation, while it is known to occur, is not the answer. Adaptation to the simulator can lead to acquisition of responses which may produce negative transfer to the aircraft. Data on the relative incidence of simulator sickness in various trainers, its symptomatology, possible etiology, possible solutions and suggestions for research are discussed. Author (GRA)

N85-18563# Joint Publications Research Service, Arlington, Va.
METHODICAL APPROACHES TO DETERMINATION OF SANITATION PROTECTIVE ZONE DIMENSIONS AROUND TV CENTERS AND TV RETRANSMITTERS Abstract Only

Y. D. DUMANSKIY, D. S. IVANOV, I. I. KARACHEV, S. V. BITKIN, and V. M. PAVLOVA *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-002) p 124 23 Jan. 1985 Transl. into ENGLISH from Gigiyena i Sanit. (Moscow), no. 8, Aug. 1984 p 62-65*

Avail: NTIS HC A09/MF A01

With the increase of the number of TV stations and TV retransmitters, the potential danger to the population from exposure to meter and decimeter long electromagnetic waves increases too. It is important to analyze each individual station and to develop a volume and space sanitation protective zone (SPZ) for each station. The SPZ is the area around the emission source at the border of which the electromagnetic field (EMF) is at the maximum permissible level. Determination of the radius of such SPZ from the equipment used at TV stations is a complex problem. A simplified method was developed consisting of four steps: (1) calculation of field intensity for a typical center; (2) plotting the distance intensity functional curves; (3) plotting the distribution curves for SPZ radii as a function of height; and (4) actual determination of SPZ area around the TV station by sanitary engineer specialists. This approach creates an atlas of curves for various TV stations which characterize the relationships between field intensity and the distance from EMF source. E.A.K.

N85-18572 Michigan State Univ., East Lansing.
SCATTERING OF ELECTROMAGNETIC WAVES BY HUMAN BODY AND ITS APPLICATIONS Ph.D. Thesis

D. K. MISRA 1984 206 p

Avail: Univ. Microfilms Order No. DA8424455

The scattering of electromagnetic waves by the human body was studied. The presence of three orthogonally aligned E-field probes, near a cylindrical model of human body illuminated by Te and TM waves, were determined theoretically. Theoretical results of the probe responses were verified experimentally using a cylindrical dielectric shell filled with saline solution. The expressions for the backscattered electric fields from a cylindrical and a spherical body illuminated by plane EM waves were obtained and their behaviors were studied when the body-radius changes with time. It is observed that the phase of the return signal changes approximately linearly with changes in the radius, while the magnitude of this signal is not linearly affected. Two different techniques for detecting the breathing and heart beats of humans from large distances are presented. Detection of the breathing and heart beats from about 100 feet and also through a concrete wall is reported. Dissert. Abstr.

N85-18573 Uniformed Services Univ. of the Health Sciences, Bethesda, Md.
BLOOD VISCOSITY RESPONSES TO ACUTE EXERCISE AND AEROBIC CONDITIONING IN WOMEN Ph.D. Thesis

D. G. MARTIN 1984 143 p

Avail: Univ. Microfilms Order No. DA8426730

Aerobic capacity is limited by the amount of oxygen delivered to the working muscles and the rate of utilization of oxygen at the tissue level. At a given arterial oxygen content the amount of oxygen delivered is a function of blood flow. Blood flow is in turn

dependent upon vascular hindrance and blood viscosity. To assess whether aerobic conditioning might alter oxygen transport through changes in blood viscosity, several components of blood viscosity were measured in healthy women. Fifteen sedentary women, 14 joggers who ran 5-15 miles per week and 18 marathoners who ran more than 50 miles per week were evaluated. When evaluated by maximum exercise tolerance on the Bruce protocol, they had clearly different maximal aerobic capacities, 34.1 + or - 5.5, 44.8 + or - 4.4 and 51.0 + or 5.2 ml kg-1 min-1, respectively, for the sedentary group, joggers and marathoners. Conditioning levels and aerobic capacities did not correlate with resting, exercise or recovery whole blood viscosity or its components. Whole blood viscosity increased with exercise in all subjects. Dissert. Abstr.

N85-18574# Naval Health Research Center, San Diego, Calif.
Environmental Medicine Dept.

MORBIDITY AND MORTALITY ASSOCIATED WITH EXPOSURE TO OTTO FUEL II IN THE U.S. NAVY 1966-1979 Interim Report

J. C. HELMKAMP, S. A. FORMAN (Naval Environmental Health Center, Norfolk, Va.), M. S. MCNALLY, and C. M. BONE Aug. 1984 24 p
 (AD-A148726; NAVHLTHRSCHC-84-35) Avail: NTIS HC A02/MF A01 CSCL 06E

This investigation assessed whether the morbidity and mortality previously associated with nitrated esters would be found in Torpedoman's Mates (TM) potentially exposed to Otto Fuel II. In the initial analysis, illness and/or death in 16 selected cardiovascular, neurologic, and toxic diagnoses were compared among potentially exposed TMs (and appropriate control groups) during the period 1966-1979. Hospitalization rates and confidence intervals were calculated and survival tables were used to calculate the probability of hospitalization. Estimates of age and occupational group-specific relative risks were then made to determine if there were any significant risk differences between study groups. There was no statistically significant excess of CVS morbidity or mortality in TMs. Lack of reliable PNEC information prior to 1970 may have introduced a selection bias that obscured the true Otto Fuel exposure experience of TMs. Additionally, the wide spectrum of disease conditions that may be associated with the use of Otto Fuel have known non-occupational risk factors and etiologies that could be confounding factors. To overcome these biases, a second analysis focused on three CVS (Cardiovascular System), conditions (acute myocardial infarction, angina pectoris and cardiac arrhythmias), known to be associated with analogous nitrated esters. Risk assessment analysis for the ten-year period (1970-1979) suggests that exposed TMs have a significantly greater risk of a CVS related hospitalization compared to other TMs and fire control technicians. GRA

N85-18575# New Jersey Medical School, Newark.
THE PHYSIOLOGY OF ULTRADIAN RHYTHMS AND THEIR ROLE IN AFFECTING DISEASE RESISTANCE Final Report, 15 Mar. 1981 - 30 Sep. 1983

B. H. NATELSON and W. N. TAPP 1 Oct. 1983 40 p
 (Contract DAMD17-80-C-0166; DA PROJ. 3E1-62777-A-879)
 (AD-A148842) Avail: NTIS HC A03/MF A01 CSCL 06E

United States military combat personnel will not always be able to maintain normal 24 hr schedules of work and rest. Our laboratory has been studying in what ways biological rhythms interact with some non-standard light-dark schedules to affect how well an animal functions and how susceptible it is to disease. Contrary to what might be expected, we have found that a number of non-24 hr schedules actually protect rodents from both stress-induced and spontaneously occurring diseases. This phenomenon, which we call chronotherapy, may eventually be used to reduce the incidence of disease in stressful situations such as in spacecraft. We hypothesize that these non-standard light-dark schedules enhance disease resistance by changing the relationships between various behavioral and physiological rhythms. To examine the relationships between rhythms in animals on non-24

52 AEROSPACE MEDICINE

hr schedules, we have developed a system which concurrently monitors behavior (motor activity, performance on a vigilance-choice task, feeding) and physiological processes (plasma cortisol; core temperature) in non-human primates. GRA

N85-18576# Oak Ridge National Lab., Tenn.

APPROACHES TO RADIATION GUIDELINES FOR SPACE TRAVEL

R. J. M. FRY 1984 25 p refs Presented at 25th Plenary Sess. of COSPAR, Graz, Austria, 25 Jun. 1984 (Contract DE-AC05-84OR-21400) (DE85-001248; CONF-8406167-5) Avail: NTIS HC A02/MF A01

There are obvious risks in space travel that have loomed larger than any risk from radiation. Nevertheless, NASA maintained a radiation program that involved maintenance of records of radiation exposure, and planning so that the astronauts' exposures are kept as low as possible, and not just within the current guidelines. These guidelines are being reexamined currently because new information is available, for example, risk estimates for radiation-induced cancer and about the effects of HZE particles. Furthermore, no estimates of risk or recommendations were made for women in 1970 and must now be considered. The current career limit is 400 rem. The appropriateness of this limit and its basis are being examined as well as the limits for specific organs. There is now considerably more information about age-dependency for radiation and this will be taken into account. Work is being carried out on the so-called microlesions caused by HZE particles and on the relative carcinogenic effect of heavy ions, including iron. A remaining question is whether the fluence of HZE particles could reach levels of concern in missions under consideration.

DOE

N85-18577# Research Inst. of National Defence, Stockholm (Sweden). Dept. 5.

HYDROGEN-OXYGEN (HYDROX) BREATHING AT 1.3MPA

H. OERNHAGEN Oct. 1983 104 p refs (FOA-C-58015-H1; ISSN-0347-7665) Avail: NTIS HC A06/MF A01

During a heliox saturation to 1.3 MPa (13 atm) three divers were exposed to mask of hydrox (hydrogen-oxygen 98/2) for periods up to 60 min. Depth narcosis, pulmonary mechanics, physical work capacity, isobaric gas supersaturation, and blood chemistry were studied. Hydrogen handling is described. No harmful effect of hydrogen as such is found. Hydrogen gives better respiration than helium. Hydrogen however has such a narcotic potency that it is probably not possible to use it at greater partial pressures than 2.0 MPa or 200 m. Author (ESA)

N85-19607# Joint Publications Research Service, Arlington, Va. **HEALTH STANDARDS FOR GENERAL VIBRATION Abstract Only**

G. A. Suvorov *In its USSR Rept.*: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-008) p 23 13 Feb. 1985 Transl. into ENGLISH from Gigiya Tr. i Prof. Zabolevaniya (Moscow), no. 10, Oct. 1984 p 9-13

Avail: NTIS HC A05/MF A01

Theoretical considerations are presented for the assessment and health standardization of the various vibrations that may affect human health. Primary effort is directed at work-related vibrations and the potential of vibration sickness arising from various man-machine interactions. Regulations established by various governmental agencies on allowable vibration levels in different situations in relation to thresholds of perception are discussed. The different intensities and their physiological and health consequences for workers are discussed. In the USSR, effective limit values were established and are being enforced, but are subject to re-evaluation as new scientific data accumulate.

A.R.H.

N85-19609# Joint Publications Research Service, Arlington, Va. **MANAGEMENT OF VIBRATION SICKNESS IN COAL MINES BY HYPERBARIC OXYGENATION Abstract Only**

N. P. SOBOLEVA *In its USSR Rept.*: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-008) p 30 13 Feb. 1985 Transl. into ENGLISH from Gigiya Tr. i Prof. Zabolevaniya (Moscow), no. 10, Oct. 1984 p 41-42

Avail: NTIS HC A05/MF A01

Clinical trials were conducted with hyperbaric oxygenation in the management of vibration sickness in 30 coal miners, 42 to 47 years of age. Assessment of the results of symptomatology and objective laboratory criteria (tetrapolar finger rheography, occlusion plethysmography) demonstrate marked improvements in the treated subjects. Headaches disappeared or diminished in intensity, irritability, and fatigability became less pronounced, sleep improved, and the emotional status of the workers provided additional confirmation of the salubrious effects. Among the more pronounced objective findings were the increase in the filling volume and in the blood flow of the peripheral vasculature, and a three-fold decrease in peripheral vascular resistance (from 97 + or 18.2 mm/m¹/100 g/min in untreated controls, to 29.0 + or - 6.4 mm/m¹/100 g/min in the treated subjects). Author

N85-19610# Joint Publications Research Service, Arlington, Va. **COMPARATIVE ASSESSMENT OF DIFFERENT TREATMENT MODALITIES IN MINERS WITH VIBRATION- AND NOISE-INDUCED DISEASE Abstract Only**

M. L. VELSKAYA, M. A. NEKHOROSHEVA, S. I. KONOVALOVA, G. V. KUKHTINA, I. G. GONCHAR, D. P. TERENTYEVA, L. A. GRISHCHEKO, N. P. SOBOLEVA, S. A. KHARITONOV, and I. V. PRIKLONSKIY *In its USSR Rept.*: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-008) p 31 13 Feb. 1985 Transl. into ENGLISH from Gigiya Tr. i Prof. Zabolevaniya (Moscow), no. 10, Oct. 1984 p 16-19

Avail: NTIS HC A05/MF A01

A group of 71 miners with vibration sickness and noise-induced pathology were managed either by standard methods, or in combination with acupuncture and/or hyperbaric oxygenation for a comparative assessment of the effectiveness of the different therapeutic approaches. Analysis of subjective factors as well as standard physiological parameters (EKG, rheoencephalography, peripheral rheography, EEG, neuropsychological tests) demonstrate that both acupuncture and hyperbaric oxygenation are effective modalities in the majority of the subjects. Nevertheless, the lack of improvement in certain criteria, or even what could be regarded as adverse sequelae, suggest that the use of hyperbaric oxygenation in the management of such disorders be approached with considerable care. Author

N85-19611# Joint Publications Research Service, Arlington, Va. **MANAGEMENT OF MICROCIRCULATORY DISORDERS IN VIBRATION SICKNESS Abstract Only**

M. I. LOSEVA, T. M. SUKHAREVSKAYA, A. M. PAKHOMONOVA, V. A. SUTORMIN, and V. Y. DIKKER *In its USSR Rept.*: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-008) p 31-32 13 Feb. 1985 Transl. into ENGLISH from Gigiya Tr. i Prof. Zabolevaniya (Moscow), no. 10, Oct. 1984 p 19-22

Avail: NTIS HC A05/MF A01

Addition of heparin or venoruton to standard management of vibration sickness was tested on 116 patients on the basis of autoaggregation test, platelet aggregation, capillary permeability, arteriovenous oxygen balance, and oxygen utilization. While standard therapeutic measures commonly employed in the treatment of vibration-induced microcirculatory disturbances yielded improvements of 2 to 4 months duration, incorporation of heparin into the therapeutic regimen (20,000 U/day parenterally, subsequently reduced to 5000 U and hand massage with heparin paste, or 10,000 U/day and subsequent massage, both approaches applied for an average of 3 weeks) or venoruton (5 ml i.m. for 5 days, followed by 1 capsule (300 mg) b.i.d. for one week and subsequent hand massage with venoruton paste) resulted in improvements that persisted for 6 months. Author

N85-19612# Joint Publications Research Service, Arlington, Va.
MODULATED SINUSOIDAL CURRENTS IN MANAGEMENT OF VIBRATION SICKNESS Abstract Only

M. M. GERASIMOVA and T. S. KUPRIYANOVA *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-008) p 43 13 Feb. 1985 Transl. into ENGLISH from Gigiyena Tr. i Prof. Zabolevaniya (Moscow), no. 10, Oct. 1984 p 39-41*
 Avail: NTIS HC A05/MF A01

Modulated sinusoidal currents (70 Hz, 75% modulated, 12 min/session, 10 to 12 sessions) were tested for therapeutic effectiveness on 79 male and female grinders and polishers with evidence of vibration sickness. The patients were monitored both subjectively and objectively (pallesthesiometry, electrothermometry, rheography, nail bed capillaroscopy) and divided into two groups on the basis of whether they were also treated with vitamins B or not. Prior to treatment all subjected showed depressed skin temperature, increased vascular tonus, and increased threshold of pallesthesia at 65 and 125 Hz frequencies. Following treatment with the modulated current both groups showed elevation in skin temperature, a decrease in pallesthesia threshold, and diminished vascular tonus in most of the patients. The results were specially satisfactory in the group on vitamin therapy, and indicate that a combination of vitamin B therapy and modulated sinusoidal current is effective in normalizing peripheral vascular status in patients with vibration sickness. Author

N85-19613# Joint Publications Research Service, Arlington, Va.
EFFECTS OF PARTIAL DEPRIVATION OF SLOW-WAVE SLEEP ON SLEEP-WAKEFULNESS CYCLES Abstract Only

T. N. ONIANI, E. O. CHIDZHAVADZE, and L. M. MAISURADZE *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-008) p 44 13 Feb. 1985 Transl. into ENGLISH from Fiz. Zh. SSSR imeni I. M. Sechenov (Leningrad), v. 70, no. 8, Aug. 1984 p 1142-1148 Original language document was announced in IAA as A85-13300*
 Avail: NTIS HC A05/MF A01

In an experimental investigation of cat sleep-wakefulness cycles, it is shown that partial (35 to 55 percent) deprivation of slow-wave sleep by electrical stimulation of the brain-stem activating structures can lead to an enhancement of behavioral sleep and a reduction of paradoxical sleep. The reduction of paradoxical sleep was induced by fragments of behavioral EEG wakefulness. In this situation no return to paradoxical sleep was observed in the postdeprivation period. The interrelationships of different phases of the sleep-wakefulness cycle are examined, as well as the interaction of EEGs and the behavioral mechanisms of sleep and wakefulness. I.H.

N85-19614# Joint Publications Research Service, Arlington, Va.
QUANTITATIVE MEASUREMENT OF HUMAN AUDITORY ACUITY Abstract Only

V. V. POPOV and A. Y. SUPIN *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-008) p 44 13 Feb. 1985 Transl. into ENGLISH from Dokl. Akad. Nauk SSSR (Moscow), v. 278, no. 4, Oct. 1984 p 1012-1016*
 Avail: NTIS HC A05/MF A01

Preliminary data are presented on an approach toward the evaluation of human auditory acuity, i.e., the minimum perceived interval between spectral peaks in an auditory signal using a modulated quasi-bell signal. Human subjects were tested both under psychophysiological and standard (pressing signal buttons) conditions; comparable results were seen. The method was therefore deemed useful in measuring human auditory acuity. The measured parameter characterizes the dependence of threshold contrast on ridge frequency of the signal, or the critical frequency perceived with 100% depth modulation. For the subjects tested, this was determined to be in the range of 20 to 25 /kHz, which corresponds to an interridge interval of 50 to 40 Hz. Author

N85-19617# Joint Publications Research Service, Arlington, Va.
SPECIFICS OF HUMAN THERMAL REGULATORY REACTIONS UPON EXPOSURE TO CORIOLIS ACCELERATION Abstract Only

O. Y. PLEPIS and L. A. GLAZNIKOV *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-011) p 1 26 Feb. 1985 Transl. into ENGLISH from Zh. Ushnykh, Nosovykh i Gorlovych Bolezney (Kiev), no. 5, Sep. - Oct. 1984 p 9-15*
 Avail: NTIS HC A05/MF A01

This work is dedicated to determination of quantitative formulas for control of thermoregulatory vascular reactions in human skin in the area of the forehead upon exposure to coriolis forces. A method of continuous accumulation of coriolis forces was used with the subject seated on a rotating chair. Skin temperature dynamics were recorded as a vestibular autonomic reaction. A high and direct variation was determined between skin temperature reaction and time of tolerance of the subjects. The mathematical calculations of the dynamics of the temperature reaction of the skin upon exposure to stimulative coriolis forces, parabolic after movement stops. Author

N85-19618# Joint Publications Research Service, Arlington, Va.
DETERMINATION OF FUNCTIONAL MOBILITY OF HUMAN NERVOUS SYSTEM WITH THE PNN-3 INSTRUMENT Abstract Only

N. V. MAKARENKO, N. V. KOLCHNEKO, and Y. L. MAYDIKOV *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-011) p 18 26 Feb. 1985 Transl. into ENGLISH from Zh. Vyssh. Nervnoy Deyatelnosti imeni I. P. Pavlova (Moscow), v. 34, no. 5, Sep. - Oct. 1984 p 972-974*
 Avail: NTIS HC A05/MF A01

The PNN-3 instrument is used for rapid diagnosis of the psychophysiological specifics of truck drivers but can be used for other psychophysiological studies. The device allows production of quantitative indices of the functional mobility of the nervous system within 5 to 7 minutes by determination of the fastest possible correct differentiation of positive and inhibitory stimuli, as well as the latent period of the visual-motor reaction of selection from among three types of stimuli. This article presents a description of the method of using the instrument. A test subject sees a light, which may be red, yellow or green. If the light is green, he is instructed to press the button beneath his left hand; if red, the button beneath the right hand; if yellow - neither button. A group of 74 males 25 to 39 years of age was tested 3 times, with intervals of 2 months and 1 year between tests. Results obtained were strongly correlated, indicating reliability of the test results produced by the instrument. Author

N85-19619# Joint Publications Research Service, Arlington, Va.
VARIABILITY OF CARDIAC RHYTHM DURING INFORMATION LOADING Abstract Only

A. I. STANKUS and Y. N. SOKOLOV *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-011) p 19 26 Feb. 1985 Transl. into ENGLISH from Fiz. Cheloveka (Moscow), v. 10, no. 5, Sep. - Oct. 1984 p 852-858*
 Avail: NTIS HC A05/MF A01

A study is presented of changes of the structure of the cardiac rhythm under the influence of measured information loading, achieved by gradually increasing the complexity of the task of distinguishing audio signals. The task of the subject was to recognize signals at a given frequency. In each subsequent stage of the test, the frequency of incorrect signals was closer to the frequency of the correct signal to which the subject was to respond. In the healthy test-subjects, the information load resulted in an increase in heart rate, with a simultaneous decrease in the total energy of the rhythmogram spectrum. Cluster analysis of curves of the variation in R-R interval as a function of stage of the study revealed two major types of curves, allowing the test-subjects to be divided into two major groups. In the first group, with higher initial heart rate, the degree of heart rate which increases during information load was also greater. Subjects with a higher level of parasympathetic influence were more effective in processing the information presented. Author

52 AEROSPACE MEDICINE

N85-19623# Joint Publications Research Service, Arlington, Va. ELECTROSLLEEP THERAPY ADVANCED AT MEDICAL INSTITUTE Abstract Only

In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-011) p 29 26 Feb. 1985 Transl. into ENGLISH from Med. Gazeta (Moscow), 7 Dec. 1984 p 3
Avail: NTIS HC A05/MF A01

Methods for preventing nervous disorders and overstress and on the improvement of electrostimulation methods for the treatment of various disorders are investigated. Conventionally practiced electrosleep methods do not take into account functional features and interactions of the brain's hemispheres. As a result, a selective method of cerebral electrostimulation using a pulsed current, optimal parameters of which are selected for the right and left hemispheres separately, taking the patient's individual signs into account was developed. This method makes it possible to heighten the therapeutic effect of electrosleep substantially and to shorten and streamline the course of therapy, it is claimed. B.W.

N85-19626# Joint Publications Research Service, Arlington, Va. BE HEALTHY, PILOT

A. POTAPENKO *In its* USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-009) p 1-2 19 Feb. 1985 Transl. into ENGLISH from Leningr. Pravda (Leningrad), 24 Nov. 1984 p 4
Avail: NTIS HC A04/MF A01

A complex Soviet program of ergonomic studies called pilot is described. The program is involved with all aspects of the professional activity of flight control staff. Preflight biomedical monitoring of pilots is mentioned. R.S.F.

N85-19628* National Aeronautics and Space Administration, Washington, D. C.

AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES

Mar. 1985 65 p
(NASA-SP-7011(269); NAS 1.21:7011(269)) Avail: NTIS HC \$7.00 CSCL 06E

This bibliography lists 180 reports, articles and other documents introduced into the NASA scientific and technical information system in February 1985. Author

N85-19629# National Aeronautics and Space Administration, Washington, D. C.

AIRCRAFT NOISE EFFECTS: AN INTERDISCIPLINARY STUDY OF THE EFFECTS OF AIRCRAFT NOISE ON MAN. PART 1: BASIC REPORT

Jun. 1980 408 p refs Transl. into ENGLISH from the book "Fluglaermwirkungen. Eine Interdisziplinaere Untersuchungen ueber die Auswirkungen des Fluglaerms auf den Menschen. Hauptbericht" Bonn-Bad Godesberg, West Germany, Harald Boldt Verlag KG, 1974 p 425-500; 540-558 Transl. by Kanner (Leo) Associates, Redwood City, Calif. 3 Vol.
(Contract NASW-3199)

(NASA-TM-75819; NAS 1.15:75819) Avail: NTIS HC A18/MF A01 CSCL 06S

An area around the Munich-Riem airport was divided into 32 clusters of different noise exposure and subjects were drawn from each cluster for a social survey and for psychological, medical, and physiological testing. Extensive acoustical measurements were also carried out in each cluster. The results were then subjected to detailed statistical analysis. R.S.F.

N85-19630*# National Aeronautics and Space Administration, Washington, D. C.

AIRCRAFT NOISE EFFECTS: AN INTERDISCIPLINARY STUDY OF THE EFFECT OF AIRCRAFT NOISE ON MAN. PART 2: APPENDIX

Dec. 1980 124 p Transl. into ENGLISH from the book "Fluglaermwirkung. Eine Interdisziplinaere Untersuchung ueber die Auswirkungen des Fluglaerms auf den Menschen. Annexband" Bonn-Bad Godesberg, West Germany, Harald Boldt Verlag KG, 1974 p 1-83; 143; 149-150; 201-228 Transl. by Kanner (Leo) Associates, Redwood City, Calif. 3 Vol.
(Contract NASW-3199)

(NASA-TM-75818; NAS 1.15:75818) Avail: NTIS HC A06/MF A01 CSCL 06S

A survey used to obtain data of a sociological nature regarding subjects used in a study of aircraft noise perception and tolerance near the Munich-Reims airport is presented. Statistics compiled on occupational, physiological, and medical aspects of the subjects are tabulated. A.R.H.

N85-19631*# National Aeronautics and Space Administration, Washington, D. C.

AIRCRAFT NOISE EFFECTS: AN INTER-DISCIPLINARY STUDY OF THE EFFECT OF AIRCRAFT NOISE ON MAN. PART 3: SUPPLEMENTARY ANALYSES OF THE SOCIAL-SCIENTIFIC PORTION OF THE STUDY ON AIRCRAFT NOISE CONDUCTED BY THE DFG

R. SCHUMER Dec. 1980 82 p refs Transl. into ENGLISH of the book "Fluglaermwirkungen. Eine Interdisziplinaere Untersuchung ueber die Auswirkungen des Fluglaerms auf den Menschen. Ergaenzende Analysen zum Sozialwissenschaftlichen Untersuchungsteil des Fluglaermprojektes der DFG" Bonn-Bad Godesberg, West Germany, Harald Boldt Verlag KG, 1974 p 1-68 Transl. by Kanner (Leo) Associates, Redwood City, Calif. 3 Vol.
(Contract NASW-3199)

(NASA-TM-75802; NAS 1.15:75802) Avail: NTIS HC A05/MF A01 CSCL 06S

Variables in a study of noise perception near the Munich-Reims airport are explained. The interactive effect of the stimulus (aircraft noise) and moderator (noise sensitivity) on the aircraft noise reaction (disturbance or annoyance) is considered. Methods employed to demonstrate that the moderator has a differencing effect on various stimulus levels are described. Results of the social-scientific portion of the aircraft noise project are compared with those of other survey studies on the problem of aircraft noise. Procedures for contrast group analysis and multiple classification analysis are examined with focus on some difficulties in their application. A.R.H.

N85-19632# Army Research Inst. of Environmental Medicine, Natick, Mass.

SKELETAL MUSCLE METABOLISM DURING EXERCISE IS INFLUENCED BY HEAT ACCLIMATION

A. J. YOUNG, M. N. SAWKA, L. LEVINE, B. S. CADARETTE, and K. B. PANDOLF 13 Dec. 1984 32 p
(Contract DA PROJ. 3E1-62777-A-879)
(AD-A148845; AD-F300518; USARIEM-M-10/85) Avail: NTIS HC A03/MF A01 CSCL 06S

The influence of heat acclimation on skeletal muscle metabolism during sub-maximal exercise was studied in 13 healthy men. The subjects performed 30 min of cycle exercise (70% of individual maximal oxygen uptake) in a cool (21 deg C, 30% rh) and a hot (49 deg C, 20% rh) environment both before and again after they were heat acclimated. Aerobic metabolism was lower (P 0.01) in the heat as compared to the cool both before and after heat acclimation. Anaerobic metabolism (indicated by changes in muscle and blood lactate) was increased (P 0.01) in the hot relative to the cool environment, both before and after acclimation. Acclimation lowered (P 0.01) aerobic and anaerobic metabolism in both environments. Despite higher respiratory exchange ratios (R) in the heat, the amount of muscle glycogen utilized during exercise did not differ from that in the cool, either before or after

acclimation. However, muscle glycogen utilization and R were reduced in both environments following acclimation. These findings show that: (1) anaerobic muscle metabolism increased to compensate for a decreased aerobic metabolism during exercise in the heat; (2) muscle glycogen is not the carbohydrate substrate for the increased muscle lactate production during exercise under extreme heat stress; and (3) heat acclimation lowers both the aerobic and anaerobic rate of metabolism during exercise in a cool as well as a hot environment. GRA

N85-19633# Army Research Inst. of Environmental Medicine, Natick, Mass.

ASSESSMENT OF MUSCLE STRENGTH AND PREDICTION OF LIFTING CAPACITY IN US ARMY PERSONNEL

J. E. WRIGHT, D. S. SHARP, J. A. VOGEL, and J. F. PATTON
5 Dec. 1984 46 p
(AD-A148846; AD-F300518; USARIEM-M-9/85) Avail: NTIS HC A03/MF A01 CSCL 06S

The purpose of this study was to determine muscular strength tests which would be appropriate for Army occupational selection and predictive of job lifting and lifting-carrying tasks. A maximum lift to 132 cm, dead lift to knuckle height and a short term self-paced maximal lift-and-carry were utilized as criterion tasks. Isometric strength measures evaluated as predictors included: handgrip, knee extension, trunk extension, upper torso arm-shoulder pull down, standing upward pull at 38 cm and 132 cm height. Dynamic strength of the trunk extensors were also measured with an isokinetic dynamometer. Studies employed both male and female soldiers. Initial analysis selected six isometric strength measures plus lean body mass as potential predictors of the best criterion variable, maximum lift capacity to 132 cm (MSLC). Males and females formed separate populations (non-coincidence) in these measures so that gender could be represented by a numerical designator as a constituent variable in a single predictive equation. Handgrip, 38cm upright pull and upper torso pull down gave similar predictive power. Ridge regression techniques were utilized to compensate for multicollinearity effects among these predictors. GRA

N85-19634# Army Research Inst. of Environmental Medicine, Natick, Mass.

HEMODYNAMICS RESPONSES TO UPRIGHT TILT AT SEA LEVEL AND HIGH ALTITUDE

C. S. FULCO and A. CYERMAN 12 Dec. 1984 25 p
(Contract DA PROJ. 3E1-62777-A-879)
(AD-A148848; AD-F300518; USARIEM-M-11/85) Avail: NTIS HC A02/MF A01 CSCL 06S

Absolute and compensatory responses to a circulatory challenge were studied by determining the changes occurring in heart rate (HR), stroke volume (SV), cardiac output (CO), calf blood flow (CBF), blood pressure (BP), total peripheral resistance (TPR), plasma norepinephrine (Nor) and blood volume (BV). Eight young men were tested at sea level (SL); after 1h at 4300m simulated altitude (SA); and at 18h, 66h and 114h during residence at 4300m (HA). HR, SV, CO, CBF, TPR and BP were obtained during supine rest and after 13 min of 60 deg head-up tilt, using an impedance monitor and an electrostethmomanometer. With continued exposure, SV, CO, TPR, and CBF responses were reduced ($p < 0.05$). These reductions were associated with a 10% decline in BV ($p < 0.01$) and a 40% increase in Nor ($p < 0.05$). It is concluded that the reduction in SV during tilt at SL and SA is compensated for by an increase in HR and TPR in order to maintain BP. After 18h HA, BP is maintained by an increase in HR and a greater and more prolonged vasoconstriction. GRA

N85-19635# New Mexico Univ., Albuquerque. School of Medicine.

THE EFFECT OF INERT GASES ON ION TRANSPORT ACROSS THE ERYTHROCYTE MEMBRANE Final Report, 1 Jun. 1976 - 31 May 1984

W. R. GALEY 18 Dec. 1984 21 p
(Contract N00014-76-C-0815)
(AD-A148889; AD-E850737) Avail: NTIS HC A02/MF A01 CSCL 06P

Hyperbaric argon stimulates active transport of sodium and potassium in the human erythrocyte. These increases in active uptake of potassium and active extrusion of sodium from the cell are related to the partial pressure of the ENG. Moderate hydrostatic pressures depress active transport in these same cells. This depression is seen under hyperbaric pressures of argon-helium mixtures to exert an effect proportional to the pressure exerted. Nitrogen, a less potent ENG than argon, increases active transport across cell membranes but to a lesser degree. This shows again the parallel between the behavioral actions of hyperbaric ENGs and their effects on cell membrane ion transport. Although active transport is stimulated by ENGs and inhibited by pressure, the ability of Na-K, ATPase (the transport enzyme) of cell membranes to hydrolyze ATP is not affected by these conditions. This suggests that the effects of pressure and ENGs may be on the stoichiometry or efficiency of the pump rather than on its activity per se. GRA

N85-19636# Naval Submarine Medical Research Lab., Groton, Conn.

EFFECT OF EXTREME PERIPHERAL LIGHT ON DARK ADAPTATION Interim Report

S. M. LURIA and J. DIVITA 16 Nov. 1984 16 p
(AD-A148923; NSMRL-1039) Avail: NTIS HC A02/MF A01 CSCL 06P

The effects of dark adaptation of light leaking around the edges of a spectacle frame worn under ambient light levels of 0.4 and 15 foot-Lamberts for 0.5 to 5 minutes were measured. Younger observers were virtually unaffected by light leaks in ambient illumination of 0.4 fL. However, after 5 minutes in ambient illumination of 15 fL, they required about 45 seconds to recover complete dark adaptation, and observers over the age of 40 required nearly three minutes. GRA

N85-19637# Federal Aviation Administration, Washington, D.C. Office of Aviation Medicine.

MEDICALLY DISQUALIFIED AIRLINE PILOTS

S. J. DARK Aug. 1984 20 p
(AD-A149454; FAA-AM-84-9) Avail: NTIS HC A02/MF A01 CSCL 06E

Observations on the airline pilot group probably come as close to a true reflection of incidence of disqualifying disease as is possible to observe. Prescreening by airline companies before employment and the FAA's requirements for issuance of a first-class medical certificate result in this group's being essentially purged of a disease prevalence that contributes to higher rates for other groups. These individuals are also less likely to voluntarily remove themselves from followup observations for known medical conditions that could preclude FAA medical certification. This study examined medical records of airline pilots medically disqualified by the FAA over a 220-year period. Date of birth, employer, date of disqualification, and reason for disqualification were recorded for each pilot. The data represent the final action taken on each pilot for a particular examination. During this period, 842 airline pilots were medically disqualified. Cardiovascular diseases represent the highest cause for denial, with age being a major factor in the incidence of cardiovascular disease. Denials for cardiovascular reasons account for 50% of all denials in this group. FAA medical certificate denial is minimal before age 45 but increases rapidly thereafter, with cardiovascular diseases responsible for more than half of this dramatic rise in incidence of disease. Maintenance of high standards of safety requires close cardiovascular supervision as pilots grow older. GRA

52 AEROSPACE MEDICINE

N85-19638# Environmental Protection Agency, Cincinnati, Ohio. Environmental Criteria and Assessment Office.

HEALTH ASSESSMENT DOCUMENT FOR CARBON TETRACHLORIDE Final Report

C. T. DEROSA, R. HERTZBERG, S. ROSENTHAL (EPA, Washington, D.C.), and C. SONICH Sep. 1984 321 p refs (PB85-124196) Avail: NTIS HC A14/MF A01 CSCL 06T

Carbon tetrachloride (CCl₄) is a haloalkane with a wide range of industrial and chemical applications. Its presence in the atmosphere and in water appears to be of anthropogenic origin. It is readily absorbed through the lung, gastrointestinal tract and skin and, therefore, poses a hazard to human health. This document is an assessment of the literature available up to March 1983, with the exception of the effect of CCl₄ on stratospheric ozone, to reflect the most recent development in this area. The scientific literature was inventoried, key studies were evaluated and summaries and conclusions were prepared to qualitatively identify the chemical's toxicity and related characteristics. Observed effect levels and dose-response relationships are discussed evaluating the potential toxicity of CCl₄. GRA

N85-19639# Environmental Protection Agency, Research Triangle Park, N.C. Environmental Criteria and Assessment Office.

MERCURY HEALTH EFFECTS UPDATE: HEALTH ISSUE ASSESSMENT Final Report

T. CLARKSON (Rochester Univ.), J. CRANMER (Arkansas Univ., Little Rock), D. J. SIVULKA (EPA, Research Triangle Park, N.C.), and R. SMITH (Michigan Univ., Ann Arbor) Aug. 1984 152 p refs

(PB85-123925; EPA/600-8-84-019F) Avail: NTIS HC A08/MF A01 CSCL 06T

This report reviews and evaluates the scientific information on the potential health effects from mercury exposure, with emphasis on those effects associated with human chronic inhalation exposures. The findings are based on a review of the scientific literature since the promulgation of the 1973 National Emission Standard for Mercury. This report consists of six chapters that provide a cohesive discussion of all aspects of mercury exposure and focus upon those data thought to be the most useful and relevant for human health risk assessment purposes.

Author (GRA)

N85-19659# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.

TOLERANCE, FATIGUE, PHYSIOLOGICAL AND PERFORMANCE EFFECTS OF SUSTAINED AND OSCILLATING LATERAL ACCELERATIONS

R. E. VANPATTEN In AGARD Human Factors Considerations in High Performance Aircraft 6 p Nov. 1984 refs

Avail: NTIS HC A09/MF A01

The advent of six degree of freedom aircraft such as the AFTI/F-16 prompted performance oriented research on the effects of sustained and oscillating lateral acceleration (+ or - G_y). The literature of classical tolerance research in lateral acceleration is reviewed as a basis for the recent centrifuge research performed at the Air Force Aerospace Medical Research Laboratory. Issues of pilot restraint, biodynamic control cross-coupling, fatigue, body positioning, and pilot performance sensitivity to lateral acceleration are discussed. Results are presented in the context of operational cockpit requirements with implications for the design and performance of future six degree of freedom fighter aircraft.

Author

N85-19660# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.

ANALYSIS OF THE TRANSIENT RESPONSE OF TEMPORAL ARTERY BLOOD FLOW DATA RELATIVE TO VARIOUS ANTI-G SUIT PRESSURE SCHEDULES

R. J. CROSBIE In AGARD Human Factors Considerations in High Performance Aircraft 11 p Nov. 1984 refs

Avail: NTIS HC A09/MF A01

A method is presented for objectively measuring the relative effectiveness of various G protective equipment or techniques by

comparing the quantitative response of a subject's mean Doppler flow velocity signal to a series of modest G profiles when using each protective system in turn. The method is applied to evaluate two configurations of the Navy's new servo controlled anti-G valve in comparison with the standard ALAR valve during exposure to G profiles having various rates of G onset. Author

53

BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

A85-22589

INTRODUCTION TO COLOR VISION

L. G. THORELL (Hewlett-Packard Corp., Cupertino, CA) IN: Advances in display technology III; Proceedings of the Meeting, Los Angeles, CA, January 18, 19, 1983. Bellingham, WA, SPIE - The International Society for Optical Engineering, 1983, p. 2-5. refs

Several human cognitive studies have reported that color facilitates certain learning, memory and search tasks. Consideration of the color-opponent organization of human color vision and the spatial modulation transfer function for color suggests several simple sensory explanations. Author

A85-23154

ADAPTIVITY OF THE EYE-HAND SYSTEM OF A HUMAN OPERATOR [ADAPTIVNOST' SISTEMY 'GLAZ-RUKA' CHELOVEKA-OPERATORA]

E. A. IVANOV IN: Methodology and techniques of psychophysiological studies of operator activity. Moscow, Izdatel'stvo Nauka, 1984, p. 18-21. In Russian.

An improved visual-motor tracking test made it possible to detect the presence, sign, and level of emotion in a human operator. The results indicate that the eye-hand functional system is a dynamic adaptive system which continuously extremizes a functional characterizing its total state. B.J.

A85-23156

A METHOD FOR CONTROLLING THE STATE OF AN OPERATOR IN CONDITIONS OF COMPLEX ACTIVITY [METOD UPRAVLENIA SOSTOIANIEM OPERATORA V USLOVIAKH OSLOZHNNENNOI DEIATEL'NOSTI]

V. A. GLAZKOVA IN: Methodology and techniques of psychophysiological studies of operator activity. Moscow, Izdatel'stvo Nauka, 1984, p. 28-35. In Russian.

Experimental data are presented which show that learning in a biofeedback system is an effective technique for improving the quality of the complex activity of a human operator in conditions of stress. It is demonstrated that, after learning in a biofeedback system, errors in the solution of operator problems are reduced substantially with a simultaneous reduction in the physiological cost of a given activity in emotionally complex situations. B.J.

A85-23159

RAPID MONITORING AND PREDICTION OF THE PSYCHOPHYSIOLOGICAL STATE OF AN OPERATOR DURING THE SIMULATION OF EMERGENCY SITUATIONS [EKSPRESS-KONTROL' I PROGNOZIROVANIE PSIKHOFIZIOLOGICHESKOGO SOSTOIANIIA OPERATORA PRI MODELIROVANII AVARIINYKH SITUATSII]

V. G. VOLKOV, V. M. MASHKOVA, and N. D. OVCHINNIKOV IN: Methodology and techniques of psychophysiological studies of operator activity. Moscow, Izdatel'stvo Nauka, 1984, p. 47-53. In Russian. refs

The effect of a simulated emergency situation (malfunction of an electrotrain system) on the psychophysiological state of operators (engine drivers) suffering from various degrees of fatigue

is evaluated. Particular consideration is given to the determination of the information content of the spatial-temporal characteristics of the tracking of discrete optical signals for the diagnostics of operator state. An effective diagnostic technique is the combination of active oculography with the recording of heart rate and arterial pressure, as well as with the determination of critical flicker fusion frequency and individual time sensation. B.J.

A85-23161

INVESTIGATION OF THE FUNCTIONAL STATE OF A HUMAN OPERATOR DURING THE FORMATION OF A MENTAL HABIT [ISSLEDOVANIE FUNKTSIONAL'NOGO SOSTOIANIIA CHELOVEKA-OPERATORA V USLOVIIAKH VYRABOTKI UMSTVENNOGO NAVYKA]

G. V. EFIMOVA and I. M. PODKLETOVA IN: Methodology and techniques of psychophysiological studies of operator activity . Moscow, Izdatel'stvo Nauka, 1984, p. 64-70. In Russian. refs

Boiko's (1976) explicit-inference method is used to study the functional state of a human operator during the formation of a mental habit. It is shown that the dynamics of the skin-galvanic response (SGR) can be correlated with changes of specific activity indices (problem-solution time and rms deviation). Patterns of variation of the phase and tonic components of the SGR are delineated which characterize different levels of the functional state of an operator during the formation of a mental habit. B.J.

A85-23226

ACTIVITY, ACT, AND THE PSYCHIC AS A PROCESS [DEIATEL'NOST', DEISTVIE I PSIKHICHESKOE KAK PROTSESS]

A. V. BRUSHLINSKII (Akademiia Nauk SSSR, Institut Psichologii, Moscow, USSR) Voprosy Psichologii (ISSN 0042-8841), Sept.-Oct. 1984, p. 17-29. In Russian. refs

A85-23227

THE DYNAMICS OF REFLEXIVE OPERATIONS IN PRODUCTIVE THINKING ACTIVITY [DINAMIKA REFLEKSIVNYKH AKTOV V PRODUKTIVNOI MYSLITEL'NOI DEIATEL'NOSTI]

V. A. MOLCHANOV (Dom Pionerov Volgogradskogo Raiona, Moscow, USSR), N. M. TROFIMOV (Kalininskii Gosudarstvennyi Pedagogicheskii Institut, Kalinin, USSR), and A. IA. BOLSHUNOV Voprosy Psichologii (ISSN 0042-8841), Sept.-Oct. 1984, p. 117-124. In Russian. refs

A85-23228

LEVELS OF DEVELOPMENT OF THE NEED FOR COGNITION [UROVNI RAZVITIIA POZNAVATEL'NOI POTREBNOSTI]

E. E. VASIUKOVA Voprosy Psichologii (ISSN 0042-8841), Sept.-Oct. 1984, p. 125-131. In Russian. refs

A85-23229

THE EFFECT OF SUCCESS AND FAILURE ON THE HUMAN FUNCTIONAL STATE [VLIANIE USPEKHA I NEUDACHI NA FUNKTSIONAL'NOE SOSTOIANIE CHELOVEKA]

N. A. BATURIN (Cheliabinskii Gosudarstvennyi Institut Fizkul'tury, Chelyabinsk, USSR) Voprosy Psichologii (ISSN 0042-8841), Sept.-Oct. 1984, p. 131-137. In Russian. refs

A85-23231

A METHOD FOR STUDYING WORK ACTIVITIES [METODIKA IZUCHENIIA TRUDOVYKH DEISTVII]

E. IU. ARTEMEVA, IU. K. STRELKOV (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR), and L. N. LUCHKO (Aeroport Domodedovo, Moscow, USSR) Voprosy Psichologii (ISSN 0042-8841), Sept.-Oct. 1984, p. 149-151. In Russian. refs

A questionnaire to identify the psychological aspects of the work of civilian air navigators is discussed. The theoretical principles used to organize such a questionnaire are considered, and a statistical technique for processing survey data is proposed. Experienced gained in a similar survey of Tu-154 pilots is emphasized. I.H.

A85-23242

IMAGE OF THE WORLD AND PSYCHOLOGICAL INVESTIGATION OF THINKING [OBRAZ MIRA I PSIKHOLOGICHESKOE IZUCHENIE MYSHLENIIA]

V. V. PETUKHOV (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Moskovskii Universitet, Vestnik, Seria 14 - Psichologii, Oct.-Dec. 1984, p. 13-21. In Russian. refs

A85-23243

EFFECT OF INTRAGROUP FAVORITISM IN LABORATORY AND NATURAL CONDITIONS [EFFEKT VNUTRIGRUPPOVOGO FAVORITIZMA V LABORATORNYKH I ESTESTVENNYKH USLOVIIAKH]

V. S. AGEEV (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) and I. V. SOLODNIKOVA Moskovskii Universitet, Vestnik, Seria 14 - Psichologii, Oct.-Dec. 1984, p. 28-38. In Russian. refs

A85-23244

FUNCTIONAL WORK LOAD ON AN OPERATOR FOR VARIOUS REGIMES OF THE MOVEMENT OF CLOSED EYES [FUNKTSIONAL'NAIA ZAGRUZHENNOST' OPERATORA PRI RAZNYKH REZHIMAKH DVIZHENIIA ZAKRYTYKH GLAZ]

T. M. BUIAKAS and T. M. FEDOROVA (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Moskovskii Universitet, Vestnik, Seria 14 - Psichologii, Oct.-Dec. 1984, p. 51-60. In Russian. refs

A85-23245

EFFECT OF VISUAL FEATURES OF THE STIMULUS MATERIAL ON THE FORMATION OF FUNCTIONAL UNITS OF MEMORY [O VLIANII VIZUAL'NYKH PRIZNAKOV MATERIALA NA FORMIROVANIE FUNKTSIONAL'NYKH EDINTS PAMIATI]

L. V. SLEPOVA (Nauchno-Eksperimental'nyi Tsentr Avtomatizatsii Upravleniya Vozdushnym Dvizheniem, USSR) and IU. K. STRELKOV (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Moskovskii Universitet, Vestnik, Seria 14 - Psichologii, Oct.-Dec. 1984, p. 61-65. In Russian. refs

A85-23250

THE COMPLEX STUDY OF MAN - THE PLACE OF PSYCHOLOGY [KOMPLEKSNOE ISSLEDOVANIE CHELOVEKA - MESTO PSIKHOLOGII]

Priroda (ISSN 0032-874X), Oct. 1984, p. 13-20. In Russian. refs

An interview with B. F. Lomov, the director of the Psychology Institute of the Soviet Academy of Sciences, is presented. The discussion deals with key problems in the study of man as a complex phenomenon, with particular emphasis on the areas where psychology touches on the natural and social sciences in this study. B.J.

A85-23276

SOME PERSPECTIVES ON THE STUDY AND IMPROVEMENT OF THE COGNITIVE-CREATIVE ACTIVITY OF AN INDIVIDUAL AND A GROUP [O NEKOTORYKH PERSPEKTIVAKH IZUCHENIIA I SOVERSHENSTVOVANIIA POZNAVATEL'NO-TVORCHESKOI DEIATEL'NOSTI LICHNOSTI I GRUPPY]

I. S. ZAMALETDINOV and R. B. BOGDASHEVSKII (Tsentr Podgotovki Kosmonavtov, USSR) Psichologicheskii Zhurnal, vol. 5, Sept.-Oct. 1984, p. 13-24. In Russian. refs

The available psychological literature concerned with the origins and characteristics of creative processes is reviewed. Attention is given to the results of experimental investigations of the cognitive and creative abilities of human operators in a variety of environments. Some practical applications of the experimental results in the fields of personnel selection and operator training are discussed. I.H.

53 BEHAVIORAL SCIENCES

A85-23277

PANORAMIC VISION AND ITS APPLICATIONS [PANORAMNOE ZRENIE I EGO PRIMENENIE]

A. N. KORENEV (Vsesoiuznyi Nauchno-Issledovatel'skii Institut Gosudarstvennoi Patentnoi Ekspertizy, USSR) Psichologicheskii Zhurnal, vol. 5, Sept.-Oct. 1984, p. 31-40. In Russian. refs

The phenomenon of 'panoramic vision' is described, and some potential applications as a speed reading technique are discussed. Panoramic vision is defined as that part of vision which occurs at the margins of the visual axes. In experiments with the vertical reading of texts, it is found that reading by panoramic vision can increase the information retention of the average reader, as well as reading speed. I.H.

A85-23278

INTERPERSONAL ACTIVITY IN CONDITIONS OF GROUP LEARNING [MEZHLICHNOSTNAIA AKTIVNOST' V USLOVIIAKH GRUPPOVOGO OBUCHENIIA]

R. S. NEMOV (Akademiiia Pedagogicheskikh Nauk SSSR, Nauchno-Issledovatel'skii Institut Obschhei i Pedagogicheskoi Psichologii, Moscow, USSR) and K. A. KHVOSTOV (Akademiiia Pedagogicheskikh Nauk SSSR, Nauchno-Issledovatel'skii Institut Trudovogo Obucheniia i Professional'noi Orientatsii, Moscow, USSR) Psichologicheskii Zhurnal, vol. 5, Nov.-Dec. 1984, p. 39-47. In Russian. refs

A85-23279

SOME PRINCIPLES FOR THE CONSTRUCTION OF AN ADAPTIVE TRAINING SYSTEM [NEKOTORYE PRINTSIPY POSTROENIIA ADAPTIVNOI SISTEMY PODGOTOVKI]

L. P. GRIMAK, V. M. VASILETS, and V. F. ZHERNAVKOV Psichologicheskii Zhurnal, vol. 5, Nov.-Dec. 1984, p. 62-68. In Russian. refs

The role of computer models in aircraft mechanic training exercises is discussed. Attention is given to some of the benefits of computer-assisted mechanical instruction, including an increase in the time available for hands-on instruction, and a more logical organization of the lesson plan. In preliminary experiments with a prototype computer training system, it was found that the computer's selections with respect to exercise complexity and lesson sequence were in substantial agreement with the selections of a number of professional aircraft mechanic trainers. I.H.

A85-23280

PSYCHOLOGICAL ASPECTS OF THE PHENOMENON OF SPATIAL SYNCHRONIZATION OF POTENTIALS [PSIKHOLOGICHESKIE ASPEKTY FENOMENA PROSTRANSTVENNOI SINKHRONIZATSII POTENTSIALOV]

M. N. LIVANOV and N. E. SVIDERSKAIA (Akademiiia Nauk SSSR, Institut Vysshei Nervnoi Deiatel'nosti i Neirofiziologii, Moscow, USSR) Psichologicheskii Zhurnal, vol. 5, Sept.-Oct. 1984, p. 71-83. In Russian. refs

The relationship between human EEG patterns in various regions of the brain (spatiotransynchronization patterns) and individual personality traits is described, on the basis of a comparison of between the patterns of a number of mental patients and normal subjects. Correlations between different personality types (pathological, schizoid, and normal), and the spatiotransynchronization patterns of EEG signals are demonstrated. Some possible applications of the experimental results in the fields of physiopsychology and experimental psychology are discussed. I.H.

A85-23281

AN INVESTIGATION OF THE PSYCHOLOGICAL ASPECTS OF INDIVIDUAL MANIFESTATIONS OF SOCIABILITY IN HUMANS [ISSLEDOVANIE PSIKHOFIZIOLOGICHESKOGO ASPEKTA INDIVIDUAL'NYKH PROIAVLENII OSHCHITEL'NOSTI CHELOVEKA]

A. I. KRUPNOV (Sverdlovskii Gosudarstvennyi Pedagogicheskii Institut, Sverdlovsk, USSR) Psichologicheskii Zhurnal, vol. 5, Sept.-Oct. 1984, p. 84-93. In Russian. refs

A85-23282

METHOD FOR THE EXPERIMENTAL STUDY OF VISUAL-MOTOR COORDINATION [METOD EKSPERIMENTAL'NOGO ZRITEL'NO-MOTORNOI KOORDINATSII]

E. A. ANDREEVA, N. IU. VERGILES, and K. E. BASYBEKOVA (Akademiiia Nauk SSSR, Institut Psichologii, Moscow, USSR) Psichologicheskii Zhurnal, vol. 5, Nov.-Dec. 1984, p. 86-92. In Russian. refs

A theoretical substantiation is given for a method involving optical feedback transformation to study the intramodal and intermodal relations of human sensory organization, particularly visual-motor coordination. This method makes it possible to vary the feedback coefficient from negative to positive infinity, and to vary the magnitude and sign of the visual-motor feedback. Optical inversion is achieved through the use of a trapezoidal lens or a system of two positive lenses. The scheme of an experimental apparatus for measuring eye and hand movements is presented. B.J.

A85-23283

THE PRINCIPLES OF EXPERIMENTAL SETUP IN MODELS OF COMPLEX HUMAN OPERATOR ACTIVITIES [PRINTSIPY POSTANOVKI EKSPERIMENTOV PRI RAZRABOTKE MODELEI SLOZHNYKH DEISTVII CHELOVEKA-OPERATORA]

G. M. ZARAKOVSKII, S. L. RYSAKOVA, and K. A. CHERNOV Psichologicheskii Zhurnal, vol. 5, Nov.-Dec. 1984, p. 93-105. In Russian. refs

A85-23284

THE EFFECT OF A TASK ON HUMAN SKIN MECHANORECEPTOR RESPONSE [VLIJANIE ZADACHI NA OTVETY KOZHNÝKHO MEKHANOREZSEPTOROV CHELOVEKA]

K. SOININEN, T. IARVILEKHTO (Helsinki, University, Helsinki, Finland), IU. I. ALEKSANDROV, and V. B. SHVYRKOV (Akademiiia Nauk SSSR, Institut Psichologii, Moscow, USSR) Psichologicheskii Zhurnal, vol. 5, Sept.-Oct. 1984, p. 104-110. In Russian. refs

In order to investigate the possibility that efferent influences associated with task performance can alter the response characteristics of human skin mechanoreceptors, the electrical activity of fibers in the skin branch of the radial nerve was measured in response to a counting task and a tactile stimulus. Nerve fiber electrical activity was measured by electrodes, and the results were compared. It is found that the pulses recorded in response to the tactile stimulus had a greater latency period, and were shorter than the pulses of the counting task response. The threshold for the pulses of the tactile stimulus response was lower in comparison with the counting task response. It is also found that the sequence of the experimental procedures influenced the observed response characteristics. I.H.

A85-23285

INTERRELATIONSHIP BETWEEN LEARNING AND DEVELOPMENT IN THE PROCESS OF MASTERING AN OCCUPATIONAL ACTIVITY [VZAIMOSVIAZ' OBUCHENIIA I RAZVITIIA V PROTSESSSE OSVOENIIA PROFESSIONAL'NOI DEIATEL'NOSTI]

V. L. SHKALIKOV and V. D. SHADRIKOV (Yaroslavskii Gosudarstvennyi Pedagogicheskii Institut, Yaroslavl, USSR) Psichologicheskii Zhurnal, vol. 5, Sept.-Oct. 1984, p. 94-103. In Russian. refs

A85-23286

AUTOMATION OF AN INVESTIGATION PROCEDURE USING A 16-FACTOR PERSONALITY QUESTIONNAIRE [AVTOMATIZATSIIA PROTSEDURY OBSODOVANIIA PRI ISPOL'ZOVANIU SHESTNADTSATIFAKTORNOGO LICHNOSTNOGO OPROSNIKA /16-FLO/]

A. A. DEEV, G. V. LOZHIN, and V. V. SPASENNIKOV Psichologicheskii Zhurnal, vol. 5, Nov.-Dec. 1984, p. 106-110. In Russian. refs

A85-23287

PROBABILISTIC MODEL OF THE UNCONSCIOUS - THE UNCONSCIOUS AS MANIFESTATION OF A SEMANTIC UNIVERSE [VEROIAVNOSTNAIA MODEL' BESSOZNATEL'NOGO - BESSOZNATEL'NOE KAK PROIAVLENIE SEMANTICHESKOI VSELENNOI]

V. V. NALIMOV and ZH. A. DROGALINA (Moskovskii Gosudarstvennyi Universitet, Moscow, USSR) Psichologicheskii Zhurnal, vol. 5, Nov.-Dec. 1984, p. 111-122. In Russian. refs

A85-23288

EXTRACTION OF A COMPLEX SIGNAL FROM MEMORY [K VOPROSU OB IZVLECHENII SLOZHNOGO SIGNALA IZ PAMIATI]

A. F. VESELKOV (Akademii Nauk SSSR, Institut Psichologii, Moscow, USSR) Psichologicheskii Zhurnal, vol. 5, Nov.-Dec. 1984, p. 126-129. In Russian. refs

A85-23289

STYLE OF PERSONAL CONTACT AS A FACTOR IN THE EFFICIENCY OF COMMUNAL ACTIVITY [STIL' OBRASHCHENIIA KAK FAKTOR EFFEKTIVNOSTI SOVMESTNOI DEIATEL'NOSTI]

T. E. ARGENTOVA Psichologicheskii Zhurnal, vol. 5, Nov.-Dec. 1984, p. 130-133. In Russian.

A85-23314

SPATIAL LOCALIZATION AND PROJECTION OF SENSORY IMAGES [PROSTRANSTVENNAIA LOKALIZATSIIA I PROEKTIIA CHUVSTVENNYKH OBRAZOV]

N. I. GUBANOV (Aktiubinskii Meditsinskii Institut, Aktiubinsk, Kazakh SSR) Filosofskie Nauki (ISSN 0015-1858), no. 3, 1984, p. 73-81. In Russian. refs

A85-24383

VISUAL PROCESSING OF MOVING STIMULI

D. H. KELLY (SRI International, Menlo Park, CA) Optical Society of America, Journal, A: Optics and Image Science (ISSN 0740-3232), vol. 2, Feb. 1985, p. 216-225. refs (Contract NIH-EY-01128)

The present investigation is concerned with problems of threshold detection, taking into account moving stimuli. Aspects of motion detection versus direction selectivity are considered along with eye-movement effects, spatiotemporal properties of the retina, inhomogeneity effects, and questions of optic-flow tuning. The review is mainly limited to a five-year period, ending in 1983. The considered results typify an era in which stabilized fixation control has progressed from an interesting curiosity to a sine qua non of precise experimentation. G.R.

A85-24384

VISION IN THE PRESENCE OF KNOWN NATURAL RETINAL IMAGE MOTION

R. M. STEINMAN, J. Z. LEVINSON (Maryland, University, College Park, MD), H. COLLEWIJN, and J. VAN DER STEEN (Rotterdam, Universiteit, Rotterdam, Netherlands) Optical Society of America, Journal, A: Optics and Image Science (ISSN 0740-3232), vol. 2, Feb. 1985, p. 226-233. refs (Contract NIH-EY-04647)

It had been found that failures of compensatory eye movements led to appreciable binocular retinal image motion during head rotation. Subjectively, the visual world appeared clear, fused, and stable under these conditions. The present investigation is concerned with a psychophysical examination of these impressions. The spatial modulation transfer function during active head oscillation is considered, taking into account an experiment with three subjects. The results obtained for all three subjects were qualitatively similar. Head movement, with its concomitant retinal image motion, produced a need for more contrast at high spatial frequencies and reduced the need for more contrast at low spatial frequencies. Attention is given to aspects of stereoacuity, and the establishment and maintenance of fusion of random-dot stereograms during head movement. G.R.

A85-24385

SMOOTH PURSUIT OF SMALL-AMPLITUDE SINUSOIDAL MOTION

A. J. MARTINS (Maryland, University, College Park, MD), E. KOWLER, and C. PALMER (Rutgers University, New Brunswick, NJ) Optical Society of America, Journal, A: Optics and Image Science (ISSN 0740-3232), vol. 2, Feb. 1985, p. 234-242. refs (Contract AF-AFOSR-00085; NIH-EY-04647)

A description is given of the study of smooth pursuit of target motions whose frequencies ranged from 0 to 5 Hz and whose amplitudes ranged from 1.9 to 30 min of arc, while the head was supported artificially. It was found that the effectiveness of smooth pursuit (the reduction of retinal-image speed) varied with target frequency. At the lowest frequencies (0.05-0.25 Hz), smooth pursuit was most effective. At higher target frequencies (0.5-2 Hz), smooth pursuit was less effective, while at the highest frequencies (3-5 Hz), smooth pursuit was totally ineffective. Smooth pursuit at intermediate target frequencies (1-4 Hz) was characterized by a systematic drift in idiosyncratic directions away from the target's mean position. The ratio of mean eye speed to mean target speed was found to decrease as target frequency increased. G.R.

A85-24386

SEQUENTIAL RECRUITMENT IN THE DISCRIMINATION OF VELOCITY

S. P. MCKEE and L. WELCH (San Francisco, Medical Research Institute, San Francisco, CA) Optical Society of America, Journal, A: Optics and Image Science (ISSN 0740-3232), vol. 2, Feb. 1985, p. 243-251. refs

(Contract NIH-5-P30-EY-01186; AF-AFOSR-82-0345)

Human observers can discriminate a 5 percent difference in velocity for a wide range of velocities. Using an apparent-motion stimulus, it is demonstrated that velocity discrimination depends on the detection of small changes in asynchrony, changes of the order of 1 msec or less. The simplest component of an apparent-motion stimulus is a pair of spatially separate lines presented asynchronously. Generally the incremental asynchrony threshold for a single pair of lines is much too large to account for velocity discrimination. A sequence of five to eight asynchronously presented targets, equivalent to continuous motion viewed for a duration of 80-100 msec, is required to reach asymptotic velocity discrimination. The experiments rule out probability summation as the explanation for the enhanced temporal sensitivity observed with the sequential presentation of multiple asynchronous targets. Sequential recruitment, a descriptive term for this enhanced temporal sensitivity, depends on the summation of a velocity-specific signal within the physiological network responding to motion. Author

A85-24387

SPATIAL AND TEMPORAL PARAMETERS OF MOTION DETECTION IN THE PERIPHERAL VISUAL FIELD

J. J. KOENDERINK, A. J. VAN DOORN, and W. A. VAN DE GRIND (Utrecht, Rijksuniversiteit, Utrecht, Netherlands) Optical Society of America, Journal, A: Optics and Image Science (ISSN 0740-3232), vol. 2, Feb. 1985, p. 252-259. Research supported by the Nederlandse Organisatie voor Zuiver-Wetenschappelijk Onderzoek. refs

The present study provides evidence that motion detectors in the peripheral visual field react to spatiotemporal structure in moving spatial white-noise patterns in a qualitatively similar fashion to those located near the center of gaze. One main result of the investigation is the discovery that the detection of movement occurs in a qualitatively and to some extent even quantitatively similar fashion all over the visual field. The results as presented in two graphs imply that the Reichardt correlator scheme is a likely mechanism for movement detection. Attention is given to the temporal and spatial properties of the correlation process, the resolution for segregation, and consequences of the obtained results for theories of egocentric localization resulting from movement parallax induced by locomotive behavior. G.R.

53 BEHAVIORAL SCIENCES

A85-24388

DISCONTINUITY LIMITS FOR THE GENERATION OF VISUAL MOTION AFTEREFFECTS WITH SINE- AND SQUARE-WAVE GRATINGS

K. TURANO and A. PANTLE (Miami University, Oxford, OH) Optical Society of America, Journal, A: Optics and Image Science (ISSN 0740-3232), vol. 2, Feb. 1985, p. 260-266. refs (Contract F33615-83-C-0507)

Visual motion aftereffects (MAE's) were produced with adapting gratings that underwent repeated, abrupt displacements in a uniform direction. MAE's could be generated with sine-wave gratings even when the magnitude of each displacement approached a phase angle as large as 1/2 cycle. The maximum spatial step for generating a MAE with a square-wave grating was less than 1/4 cycle. If a dark pause was introduced between the successive positions (phases) of the adapting grating, MAE's disappeared when the pause was longer than 60-70 msec. The results can be used to define the spatiotemporal-response limits of a short-range motion process (or system of directionally selective motion sensors), and the results also suggest that the individual Fourier components of complex spatial patterns are capable of producing independent signals for direction of motion. Author

A85-24389

RECEPTIVE-FIELD SYMMETRY PROBED USING CONVERGING GRATINGS

D. G. STORK (Swarthmore College, Swarthmore, PA; Maryland, University, College Park, MD), J. Z. LEVINSON, and D. S. FALK (Maryland, University, College Park, MD) Optical Society of America, Journal, A: Optics and Image Science (ISSN 0740-3232), vol. 2, Feb. 1985, p. 275-279. refs (Contract NIH-EY-01640)

Contrast-sensitivity functions (CSF's) for converging and diverging gratings were obtained under voluntary fixation at several field widths and under retinal stabilization at one field width. In general, these types of gratings had similar CSF's at all temporal frequencies tested, a result that can be explained by plausible spatiotemporal receptive-field models possessing spatial antisymmetry but not by models possessing pure (even) spatial symmetry. Phase condition at the central line in converging and diverging gratings affected grating detectability at high spatial frequencies, as expected. Author

A85-24390

VISUAL RESPONSES TO VORTICITY AND THE NEURAL ANALYSIS OF OPTIC FLOW

D. REGAN and K. I. BEVERLEY (Dalhousie University, Halifax, Canada) Optical Society of America, Journal, A: Optics and Image Science (ISSN 0740-3232), vol. 2, Feb. 1985, p. 280-283. Research sponsored by the Natural Sciences and Engineering Research Council of Canada. refs (Contract AF-AFOSR-78-3711)

Koenderink and van Doorn (1976) have described visual flow fields in the notation of vector calculus. Longuet-Higgins and Prazdny (1980) have discussed this analysis and pointed out that there is psychophysical evidence that the human visual system contains a specialized mechanism sensitive to $\text{div } V$. It was suggested that the human visual system might further mimic vector calculus by containing an independent neural mechanism for vorticity. The present investigation is concerned with an experimental test of Longuet-Higgins and Prazdny's suggestion. It is found that visual responses to rotary motion cannot be explained in terms of responses to linear motion. A rationale for distinguishing between visual responses to unidirectional motion and visual responses to vorticity is discussed. G.R.

A85-24391

SPATIOTEMPORAL ENERGY MODELS FOR THE PERCEPTION OF MOTION

E. H. ADELSON and J. R. BERGEN (RCA David Sarnoff Research Center, Princeton, NJ) Optical Society of America, Journal, A: Optics and Image Science (ISSN 0740-3232), vol. 2, Feb. 1985, p. 284-299. refs

A motion sequence may be represented as a single pattern in x-y-t space; a velocity of motion corresponds to a three-dimensional orientation in this space. Motion information can be extracted by a system that responds to the oriented spatiotemporal energy. A class of models is discussed for human motion mechanisms in which the first stage consists of linear filters that are oriented in space-time and tuned in spatial frequency. The outputs of quadrature pairs of such filters are squared and summed to give a measure of motion energy. These responses are then fed into an opponent stage. Energy models can be built from elements that are consistent with known physiology and psychophysics, and they permit a qualitative understanding of a variety of motion phenomena. Author

A85-24393* National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

MODEL OF HUMAN VISUAL-MOTION SENSING

A. B. WATSON and A. J. AHUMADA, JR. (NASA, Ames Research Center, Moffett Field, CA) Optical Society of America, Journal, A: Optics and Image Science (ISSN 0740-3232), vol. 2, Feb. 1985, p. 322-342. refs

A model of how humans sense the velocity of moving images is proposed. The model exploits constraints provided by human psychophysics, notably that motion-sensing elements appear tuned for two-dimensional spatial frequency, and by the frequency spectrum of a moving image, namely, that its support lies in the plane in which the temporal frequency equals the dot product of the spatial frequency and the image velocity. The first stage of the model is a set of spatial-frequency-tuned, direction-selective linear sensors. The temporal frequency of the response of each sensor is shown to encode the component of the image velocity in the sensor direction. At the second stage, these components are resolved in order to measure the velocity of image motion at each of a number of spatial locations and spatial frequencies. The model has been applied to several illustrative examples, including apparent motion, coherent gratings, and natural image sequences. The model agrees qualitatively with human perception. Author

A85-24433

LOSS OF SPATIAL PHASE RELATIONSHIPS IN EXTRAFOVEAL VISION

I. RENTSCHLER and B. TREUTWEIN (Muenchen, Universitaet, Munich, West Germany) Nature (ISSN 0028-0836), vol. 313, Jan. 24, 1985, p. 308-310. Research supported by the Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung. refs

The iso-second-order texture paradigm of Julesz (1981) is applied to the visual discrimination of compound gratings in order to distinguish between the detection of phase-related changes in contrast and phase coding in the visual system. The results show that the energy detection properties of both foveal and peripheral vision are comparable; independently of scale, however, peripheral vision ignores the relative position of image components. C.D.

A85-24501

INTERACTION BETWEEN SACCADE AND TRACKING VERGENCE

S. SAIDA (Industrial Products Research Institute, Tsukuba, Ibaraki, Japan; York University, Downsview, Ontario, Canada) and H. ONO (York University, Downsview, Ontario, Canada) Vision Research (ISSN 0042-6989), vol. 24, 1984, p. 1289-1294. Sponsorship: National Research Council of Canada. refs (Contract NRC A-0296)

Additivity of saccade and tracking vergence was examined. Binocular eye movements were measured photoelectrically while

subjects tracked a target moving smoothly on a radial line with an interpolated step change to a new radial line. Examining the abrupt portions of the two eyes' movements, it is found that the durations were almost the same for the two eyes, but that there were reliable differences in the magnitudes which were too large to be understood by an additivity hypothesis. Author

A85-25199#

A MATHEMATICAL MODEL OF VISUAL PERCEPTION REGARDING PERIPHERAL VISION AND ITS APPLICATION TO THE HERMANN'S ILLUSION

T. OYAMA, T. YAMANOI, T. YAMAZAKI, and M. KAWAGUCHI
Hokkaido University, Faculty of Engineering, Bulletin (ISSN 0385-602X), no. 123, Oct. 1984, p. 67-76. In Japanese, with abstract in English. refs

Human visual perception is treated on the basis of the concepts of receptive field in physiology and in psychology. The distribution of receptive field on the retina is assumed by the fact that the central vision differs from the peripheral one. A function is introduced so that it fits the assumption. A mathematical model of visual output function is determined by the function introduced and by the model of the lateral inhibition. The deeper understanding of the mechanism of the Hermann's illusion is acquired by this model. Author

A85-25774

SUPRATHRESHOLD CONTRAST PERCEPTION AT DIFFERENT LUMINANCE LEVELS

A. R. RIONDINI and M. L. F. DE MATTIELLO (Consejo Nacional de Investigaciones Científicas y Técnicas, Buenos Aires, Argentina) Vision Research (ISSN 0042-6989), vol. 25, no. 1, 1985, p. 1-9. refs

Magnitude estimation experiments show that the perceived contrast of sine waves is a linear function of stimulus contrast at some mean luminance (L_m), spatial frequency and contrast levels, but not at others. For monocular vision at both low and high contrast levels, linearity is observed within a limited zone which, at high L_m levels, does not include intermediate frequencies. Binocular vision gives similar results at high contrast levels, while for low levels, the linearity zone comprises intermediate frequencies in a wide L_m range. It is demonstrated that if a threshold correction is introduced into the obtained psychophysical functions, the described linearity zones extend to wider L_m and contrast ranges. Author

A85-25789

NEURAL DYNAMICS OF BRIGHTNESS PERCEPTION FEATURES, BOUNDARIES, DIFFUSION, AND RESONANCE

M. A. COHEN and S. GROSSBERG (Boston University, Boston, MA) Perception and Psychophysics (ISSN 0031-5117), vol. 36, no. 5, Nov. 1984, p. 428-456. refs
(Contract NSF-IST-80-00257; AF-AFOSR-82-0148; N00014-83-K-0337)

Quantitative simulations of monocular and binocular brightness data are described to illustrate and support a real-time perceptual processing theory. Attention is given to paradoxical percepts as probes of adaptive processes, the boundary-contour system and the feature-contour system, boundary contours and boundary completion, feature contours and diffusive filling-in, a macrocircuit of processing stages, the interplay of controlled and automatic processes, Craik-O'Brien luminance profiles and multiple step illusions, Fechner's paradox, and the simulation of a parametric binocular brightness study. The obtained results suggest that several of the most basic concepts of visual theory need to be refined. G.R.

A85-25790* Miami Univ., Oxford, Ohio.

TILT FROM A HEAD-INVERTED POSITION PRODUCES DISPLACEMENT OF VISUAL SUBJECTIVE VERTICAL IN THE OPPOSITE DIRECTION

D. E. PARKER and R. L. POSTON (Miami University, Oxford, OH) Perception and Psychophysics (ISSN 0031-5117), vol. 36, no. 5, Nov. 1984, p. 461-465. refs
(Contract NAS9-14538)

Observers who lie supine with their heads inverted report large (up to 60 deg) tilt of a light line in an otherwise dark room when their heads and/or bodies are tilted. Most observers report that visual subjective vertical is tilted in the direction opposite to the head/body tilt. The results can be interpreted by employing a model developed by Mittelstaedt (1983), which suggests that visual subjective vertical is derived from a gravity vector transduced by vestibular and somesthetic receptors combined with 'idiotropic vectors' that represent the orientation of the observer's own head and body axes. Author

A85-25791

MERIDIONAL ANISOTROPY OF SPATIAL DISPLACEMENT DETECTION

P. C. QUINN, C. F. MOSS, and S. LEHMKUHLE (Brown University, Providence, RI) Perception and Psychophysics (ISSN 0031-5117), vol. 36, no. 5, Nov. 1984, p. 466-472. refs
(Contract NIH-EY-03524)

The influence of spatial and temporal frequency on possible meridional variations in spatial displacement detection were examined. The results indicate that a spatial displacement detection oblique effect occurs at high spatial frequencies and low temporal frequencies. This anisotropy is not due to differences in perceived contrast along the vertical and oblique axes, since the orientations were equated for perceived contrast in each of the stimulus conditions. The spatial-displacement oblique effect is similar to both the contrast sensitivity and perceived contrast oblique effects in its dependence on the spatial and temporal properties of a stimulus. These different oblique effects are discussed in terms of a possible common neural basis. Author

A85-25814

THE COLOURS ARE NOT ON THE DISPLAY - A SURVEY OF NON-VERIDICAL PERCEPTIONS THAT MAY TURN UP ON A COLOUR DISPLAY

J. WALRAVEN (Institute for Perception TNO, Soesterberg, The Netherlands) Displays (ISSN 0141-9382), vol. 6, Jan. 1985, p. 35-42. refs

Designers and users of color-coded visual displays may be confronted by puzzling artefacts that are produced by the physiological mechanisms of visual perception. In this review a variety of such visual oddities is described, their nature is discussed, and suggestions are provided for dealing with them. The phenomena to be discussed are small-field tritanopia, peripheral color vision, the Bezold-Brücke effect, the Helmholtz-Kohlrausch effect, the Abney effect, chromatic induction, assimilation, the McCullough effect, the 'fluttering hearts' phenomenon, chromatic aberration, and color stereoscopy. Author

A85-25815

SPATIAL CONTRAST DETECTION FOR COLOUR PATTERNS UNDER SELECTIVE CHROMATIC ADAPTATION

C. BOURDY, F. VIENOT, A. MONOT, and A. CHIRON (Museum National d'Histoire Naturelle, Paris, France) (NATO, Workshop on Colour-Coded Versus Monochrome Electronic Displays, Farnborough, Hants., England, Feb. 28-Mar. 1, 1984) Displays (ISSN 0141-9382), vol. 6, Jan. 1985, p. 43-51. refs

This paper reports the results of a fundamental study investigating the filtering characteristics of the human color mechanisms that encode spatial information. The shape of the contrast sensitivity function of the human visual system with red, green and blue stimuli was investigated under selective chromatic adaptation, and at eccentricities of 0 deg, 13 deg and 26 deg. The results are compared with those obtained with an achromatic test, at the same eccentricities. The band-pass character of the

53 BEHAVIORAL SCIENCES

contrast sensitivity function is brought to light for the three selective chromatic adaptation states obtained. It is more pronounced in peripheral than in foveal vision, whatever the temporal frequency tested. The authors suggest an interpretation of the shape changes of the contrast sensitivity curves based on the neurological properties of achromatic and chromatic mechanisms. The functional exploration of the neurophysiological and optical properties of the visual system may be useful to display designers and users as far as the system efficiency for using color as an information code is concerned.

Author

A85-25825

VISUAL FLOW AND DIRECTION OF LOCOMOTION

H. F. PRIEST (Canterbury, University, Christchurch, New Zealand; Cornell University, Ithaca, NY) and J. E. CUTTING (Cornell University, Ithaca, NY) *Science* (ISSN 0036-8075), vol. 227, March 1, 1985, p. 1063, 1064; Author's reply, p. 1064, 1065. refs

Two criticisms of the results of Regan and Beverley's (1982) simulation of the optic array of a moving observer looking to one side while approaching a line of static objects are presented, and Regan and Beverley reply. The first criticism takes issue with the conclusion of Regan and Beverley that, in judging the direction of locomotion, the point of maximum rate of magnification may be sufficient, but the optical focus of expansion is not. The second criticism defends the theory of Gibson (1958) that the center of the expanding flow pattern in the retinal image (provides) a generally useful aid to accurately judging to the direction of self motion against the criticism of Regan and Beverley.

C.D.

A85-25985

TACTICAL FIGHTER AIRCRAFT TRAINING

J. GRAHAM, JR. (USAF, Tactical Air Command, Langley AFB, Hampton, VA) Society of Automotive Engineers, Aerospace Congress and Exposition, Long Beach, CA, Oct. 15-18, 1984. 14 p. refs

(SAE PAPER 841587)

The U.S. Air Force's Tactical Air Command (TAC) trains pilots in progressive phases. In the first of these, 'Lead-In Training', the AT-38 Talon fighter-trainer is used to develop skills required for piloting such diverse high performance aircraft as the F-15 air superiority fighter, F-16 multirole fighter, and A-10 close air support aircraft. Operation of the AT-38 in training costs TAC \$816.00/flight hour, by comparison with 2-7 times as much for operational fighters. The next phase, 'Initial Qualification', involves the transfer of skills learned with the AT-38 to front-line aircraft. The 'Mission Qualification' phase adapts fighter skills to specific unit missions, and then new tactics and skills are learned in the course of 'Continuation Training'.

O.C.

A85-25987

UNITED STATES AIR FORCE UNDERGRADUATE PILOT TRAINING TODAY AND TOMORROW

J. P. SMOTHERMON (USAF, Air Training Command, Randolph AFB, TX) Society of Automotive Engineers, Aerospace Congress and Exposition, Long Beach, CA, Oct. 15-18, 1984. 10 p.

(SAE PAPER 841589)

Attention is given to the development history, current status, and prospective trends in training philosophy, training aircraft, and prescribed instruction of the U.S. Air Force's Undergraduate Training Program (UTP). At present, the T-37 is the primary trainer aircraft of UTP, and the T-38 is used after initial experience with the T-37 as a basic trainer. Annually, 2000 pilots receive 175 hours of instruction in these aircraft. The T-46 will soon supplant the T-37 as primary trainer, and will offer substantial improvements in performance, safety, and operating costs. Also projected is a shift to Specialized Undergraduate Pilot Training after primary trainer experience, with a clear differentiation being made between fighter/attack/reconnaissance and tanker/transport/bomber roles.

O.C.

A85-26256

THE BASIC PROPERTIES OF THE NERVOUS SYSTEM AND THEIR ROLE IN OCCUPATIONAL ACTIVITY [OSNOVNYE SVOISTVA NERVNNOI SISTEMY I IKH ROL' V PROFESSIONAL'NOI DEIATEL'NOSTI]

N. V. MAKARENKO (Akademiiia Nauk Ukrainskoi SSR, Institut Fiziologii, Kiev, Ukrainian SSR) *Fiziologicheskii Zhurnal* (Kiev) (ISSN 0201-8489), vol. 30, July-Aug. 1984, p. 401-409. In Russian. refs

The relationship between the basic properties of the nervous system and the patterns of psychophysiological reactions to different occupational activities is discussed, with reference to the available experimental data. It is shown that there is a significant correlation between the functional capacity of the nervous system and the level of brain efficiency required for different types of work. A complex interrelationship is demonstrated between the capacity short-term memory of a worker, changes in EEG rhythm, and the length of the latent period of a complex choice response to sensory stimuli. The role of individual and typological characteristics of the higher central nervous system in the processes of learning and retaining occupational skills is described. The applications of psychophysiological testing to the development of personnel selection criteria and on-the-job evaluations is considered.

I.H.

N85-18010*# Seville Training Systems Corp., Pensacola, Fla.
FLIGHT CREW TRAINING TECHNOLOGY: A REVIEW

P. W. CARO *In NASA*. Ames Research Center Flight Training Technol. for Regional/Commuter Airline Operations p 9-39 Dec. 1984 refs

Avail: NTIS HC A12/MF A01 CSCL 051

The process of flight crew training is emphasized herein. Flight simulators and other training equipment are discussed, but the point is made that such equipment does not constitute the training process in its entirety. The development of flight training technology is traced from the period prior to World War I to the present. Computer generated imagery in flight simulation is addressed.

R.S.F.

N85-18011*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

LOW-COST TRAINING TECHNOLOGY

A. T. LEE *In its Flight Training Technol. for Regional/Commuter Airline Operations* p 41-55 Dec. 1984

Avail: NTIS HC A12/MF A01 CSCL 051

The differences between flight training technology and flight simulation technology are highlighted. Examples of training technologies are provided, including the Navy's training system and the interactive cockpit training device. Training problems that might arise in the near future are discussed. These challenges follow from the increased amount and variety of information that a pilot must have access to in the cockpit.

R.S.F.

N85-18012*# USAir, Pittsburgh, Pa.

CAPTAIN DEVELOPMENT TRAINING AT US AIR

S. FICKES *In NASA*. Ames Research Center Flight Training Technol. for Regional/Commuter Airline Operations p 57-77 Dec. 1984

Avail: NTIS HC A12/MF A01 CSCL 051

The flight training program practiced at US Air is reviewed. The background and development of the program are discussed. Specific program activities and curricula are considered. The issue of educating pilots to be aware of and admit significant flight stress and stress in their personal lives is addressed.

R.S.F.

**N85-18013*# Piedmont Aviation, Inc., Winston-Salem, N. C.
MANAGEMENT TRAINING FOR COCKPIT CREWS AT
PIEDMONT FLIGHT**

J. C. SIFFORD *In NASA. Ames Research Center Flight Training Technol. for Regional/Commuter Airline Operations p 79-101 Dec. 1984*

Avail: NTIS HC A12/MF A01 CSCL 051

A brief history of Piedmont Airlines' flight operations is presented. A captain-management seminar conducted regularly by Piedmont is discussed. Piedmont's approach to cockpit resource management (CRM) is reviewed, and the relationship of CRM training to other aspects of flight training is addressed. Future leadership research plans and CRM training is considered along with critical training issues. R.S.F.

N85-18014*# United Air Lines, Inc., Chicago, Ill.

INTEGRATED APPROACH TO FLIGHT CREW TRAINING

J. E. CARROLL *In NASA. Ames Research Center Flight Training Technol for Regional/Commuter Airline Operations p 103-119 Dec. 1984*

Avail: NTIS HC A12/MF A01 CSCL 051

The computer based approach used by United Airlines for flight training is discussed. The human factors involved in specific aircraft accidents are addressed. Flight crew interaction and communication as they relate to training and flight safety are considered. R.S.F.

N85-18015*# Pennsylvania Airlines, Middletown.

VIDEO CONCEPTS IN CRM TRAINING

M. YOCUM *In NASA. Ames Research Center Flight Training Technol. for Regional/Commuter Airline Operations p 123-135 Dec. 1984*

Avail: NTIS HC A12/MF A01 CSCL 051

Cockpit resource management (CRM) is discussed in the context of programs developed by Pennsylvania Airlines and Ransome Airlines. Video techniques in flight training are emphasized. Problems in cockpit interpersonal communication are addressed. R.S.F.

N85-18016*# Metro Air, Ronkonkoma, N.Y.

USE OF SIMPLIFIER SCENARIOS FOR CRM TRAINING

D. WEATHERLY *In NASA. Ames Research Center Flight Training Technol. for Regional/Commuter Airline Operations p 137-142 Dec. 1984*

Avail: NTIS HC A12/MF A01 CSCL 051

Cockpit resource management (CRM) at Metro Airlines is discussed. The process by which the program of CRM training was initiated is mentioned. Management aspects of various flying scenarios are considered. The transfer of training from the classroom to the field is assessed. R.S.F.

N85-18017*# Air Midwest, Inc., Wichita, Kans.

COMMUNICATIONS SKILLS FOR CRM TRAINING

M. SHEARER *In NASA. Ames Research Center Flight Training Technol. for Regional/Commuter Airline Operations p 143-146 Dec. 1984*

Avail: NTIS HC A12/MF A01 CSCL 051

A pilot training program in communication skills, listening, conflict solving, and task orientation, for a small but growing commuter airline is discussed. The interactions between pilots and management, and communication among crew members are examined. Methods for improvement of cockpit behavior management personnel relations are investigated. E.A.K.

N85-18018*# Scenic Air Lines, Inc., Las Vegas, Nev.

DYNAMIC TRAINING DEVICES IN CRM TRAINING

J. LAWVER *In NASA. Ames Research Center Flight Training Technol. for Regional/Commuter Airline Operations p 147-153 Dec. 1984*

Avail: NTIS HC A12/MF A01 CSCL 051

Pilot training effectiveness and flying safety of a seasonal tour flight company are described. The change from single pilot to two pilot operated twin otters is examined. The use of the ATC 810 training device, its possibilities and training capacity is outlined.

Problem areas which may arise, emergency system and pilot/passenger interaction are analyzed. E.A.K.

N85-18019*# Air Wisconsin, Inc., Appleton.

USE OF AIRPLANES FOR LOFT TRAINING

M. SELE *In NASA. Ames Research Center Flight Training for Regional/Commuter Airline Operations p 155-157 Dec. 1984*

Avail: NTIS HC A12/MF A01 CSCL 051

The use of an aircraft for line oriented flight training (LOFT) is examined. Cockpit resource management (CRM) and LOFT training are compared. The advantages of the LOFT is a better cost effectiveness since there is no need to buy a simulator. The flight crew workload can be limited to a minimum. E.A.K.

N85-18024*# Ransome Airlines, Philadelphia, Pa.

SIMULATION

F. FOSTER and R. RANDLE *In NASA. Ames Research Center Flight Training Technol. for Regional/Commuter Airline Operations p 211-219 Dec. 1984*

Avail: NTIS HC A12/MF A01 CSCL 051

The application of flight simulation in regional airline training programs is discussed. Specifically, the use of simulation in cockpit resources management training (CRMT) is investigated. The availability of simulation resources is explored and the simulator disadvantages and advantages are cited. Problems with simulator specification, procurement, validation and use that have plagued the major air carriers over several decades are addressed. B.W.

N85-18025*# Scenic Air Lines, Inc., Las Vegas, Nev.

LOW COST TRAINING AIDS AND DEVICES

J. LAWVER and A. LEE *In NASA. Ames Research Center Flight Training Technol. for Regional/Commuter Airline Operations p 221-228 Dec. 1984*

Avail: NTIS HC A12/MF A01 CSCL 051

The need for advanced flight simulators for two engine aircraft is discussed. Cost effectiveness is a major requirement. Other training aids available for increased effectiveness are recommended. Training aids include: (1) audio-visual slides; (2) information transfer; (3) programmed instruction; and (4) interactive training systems. B.W.

N85-18028*# Command Airways, Wappingers Falls, N.Y.

INNOVATIVE APPROACHES TO RECURRENT TRAINING

H. NOON and M. MURPHY *In NASA. Ames Research Center Flight Training Technol. for Regional/Commuter Airline Operations p 249-263 Dec. 1984*

Avail: NTIS HC A12/MF A01 CSCL 051

Innovative approaches to recurrent training for regional airline aircrews are explored. Guidelines for recurrent training programs which include incorporation of cockpit resource management are discussed. B.W.

N85-18561# Joint Publications Research Service, Arlington, Va.

ROLE OF ENGINEERING PSYCHOLOGY

A. SAVAYAN *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-002) p 26-30 23 Jan. 1985 Transl. into ENGLISH from Trud (Moscow), 18 Sep. 1984 p 3*

Avail: NTIS HC A09/MF A01

Human factors engineering in the working force is discussed. The psychological effects of automation and robotics are analyzed. The contribution of human factors to work accidents and lost work hours is outlined. Psychological fitness of equipment operators for the appropriate jobs is outlined. E.A.K.

N85-18570# Joint Publications Research Service, Arlington, Va.

PROBLEMS OF PSYCHOLOGICAL SUPPORT OF AUTOMATED ORGANIZATION CONTROL SYSTEMS Abstract Only

B. S. BEREZKIN *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-007) p 65 6 Feb. 1985 Transl. into ENGLISH from Psichologicheskiy Zh. (Moscow), v. 5, no. 4, Jul. - Aug. 1984 p 74-82*

Avail: NTIS HC A11

Simple mathematical equations are developed to relate the quantity of information assimilated to the basic quantities

53 BEHAVIORAL SCIENCES

characterizing the process of input and storage of information in memory. This allows the development of quantitative values for the major variables measured in experiments and comparison of calculated quantities with known experimental results, and also allows a prediction to be made of the relative behavior of a given process related to the functioning of memory. The mathematical equations presented can be used to determine quantitatively the information contained in human memory as a function of the characteristics of the process of input and storage of information. Checking of the mathematical model using experimental data known from the literature has shown its good agreement with experimental data, allowing it to be recommended for practical use.

Author

N85-18571# Joint Publications Research Service, Arlington, Va.
PROBLEMS OF PSYCHOLOGICAL SUPPORT OF AUTOMATED ORGANIZATION CONTROL SYSTEMS Abstract Only
B. S. BEREZKIN *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-007)* p 65-66 6 Feb. 1985
Transl. into ENGLISH from Psikhologicheskiy Zh. (Moscow), v. 5, no. 4, Jul. - Aug. 1984 p 74-82

Avail: NTIS HC A11

Hopes for improving the quality of administration by introducing automated systems have not been fully realized, primarily because the automation equipment has yet to become a true assistant to administrators at all levels. Automation is hardly used where it might be most effective, in decision support systems at high administrative levels. Many systems now in operation have underestimated the significance of man in modern administrative systems. The problems of psychological support of automatic organizational control systems can be defined as support of inter-organizational interactions as well as internal problems or organization of users, developers, and administrative system personnel. Tasks include increasing the convenience of interaction of users with automation equipment, supporting training of users for interaction with automatic equipment, and assuring psychological safety for users as they work with automation equipment. Problems include the creation of the necessary psychological tool kit and development of new forms of interaction among academic, research, and development institutions. Author

N85-18578# EEG Systems Lab., San Francisco, Calif.
NEUROCOGNITIVE PATTERN ANALYSIS OF AN AUDITORY AND VISUAL NUMERIC MOTOR CONTROL TASK. PART 1: DEVELOPMENT OF METHODS Final Report, 22 Feb. 1982 - 30 Sep. 1984

A. S. GEVINS, S. L. BRESSLER, B. A. CUTILLO, J. C. DOYLE, and N. H. MORGAN Oct. 1984 96 p
(Contract F49620-82-K-0006)
(AD-A148809; AFOSR-84-1107TR) Avail: NTIS HC A05/MF A01 CSCL 05

New advances in understanding human neurocognitive functions must come from new technologies for measuring split-second changes in event related electrical and magnetic fields which may soon complement the anatomical information produced by CT and NMR brain scans and the static metabolic images of PET scans. As a contribution to this effort, the EEGSL is developing the method of Neurocognitive Pattern (NCP) Analysis to study both simple and complex cognitive tasks. A number of previous findings suggest that neither strictly localizationist (single equivalent dipole) nor equipotentialist (hologram) models of neurocognitive processing are realistic. Rather, a more appropriate model seems to be a distributed computational network in which there is continuous communication between many parallel, specialized processing elements. In order to better measure and model these complex processes, the initial thirty months of this project focused on developing experimental tasks and advanced recording and analysis technologies.

GRA

N85-19620# Joint Publications Research Service, Arlington, Va.
STUDY OF COGNITIVE STYLES OF STUDENTS IN AUTOMATED TEACHING SYSTEM Abstract Only

T. A. BRUTSENKOVA *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-011)* p 19-20 26 Feb. 1985
Transl. into ENGLISH from Vopr. Psikhologii (Moscow), no. 4, Jul. - Aug. 1984 p 70-76

Avail: NTIS HC A05/MF A01

Computer-assisted experiments revealed cognitive styles in students which must be considered during development of computer-assisted teaching systems and showed the possibility of using computer-based teaching systems in psychological study of aspects of teaching. Subjects included 12 8th grade students and 7 Moscow State University students using 3 variants of the BASIC language. Two cognitive styles were noted. Subjects with cognitive style A acted impulsively without preliminary analysis of the situation, used trial and error and guess work and did not worry about mistakes, while those with cognitive style B were very cautious, analyzed carefully in order to avoid errors, checked their answers carefully, made few errors but were greatly bothered by them. The experiments showed the advisability of using computer-assisted teaching methods in teaching students with individual differences. A brief account of the history of the study of this problem is presented.

Author

N85-19621# Joint Publications Research Service, Arlington, Va.
FUNCTIONAL ROLE OF TYPE OF PERSON'S TEMPERAMENT IN INDIVIDUAL AND MUTUAL ACTIVITY Abstract Only

V. V. BELOUS *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-011)* p 20 26 Feb. 1985
Transl. into ENGLISH from Vopr. Psikhologii (Moscow), no. 4, Jul. - Aug. 1984 p 102-107

Avail: NTIS HC A05/MF A01

Study of 48 students, ranging in age from 18-20 years, in 2 series of experiments, revealed an A-type temperament (extroverted, changeable, not overly cautious, emotional and impulsive) and a B-type temperament (introverted, rigid and anxious). A-type subjects were more successful in work requiring speed in reception and processing of information while B-type subjects excelled at regulated activity, controlled by the subject himself. Subjects with different types of temperament were equally valuable in individual higher level activities. Effectiveness of common activity was linearly dependent on properties of the psychodynamic level of integral individuality.

Author

N85-19622# Joint Publications Research Service, Arlington, Va.
DIALOG SYSTEM OF PREPARATION AND PRESENTATION OF VISUAL INFORMATION Abstract Only

A. P. KULACHEV, D. M. RAMENDIK, and M. V. SLAVUTSKAYA *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-011)* p 20 26 Feb. 1985
Transl. into ENGLISH from Vopr. Psikhologii (Moscow), no. 4, Jul. - Aug. 1984 p 118-120

Avail: NTIS HC A05/MF A01

A dialog system to be used as an automated means of preparing and carrying out experimental studies of men solving problems involving visual presentation of information is described. Detailed explanation of the operation of the system is presented and an experiment of an engineering psychological nature and one involving study of solution of complex logic problems are presented and discussed. The experimenter may employ the display and its standard keyboard to set up and carry out the experiment. B.W.

N85-19624# Joint Publications Research Service, Arlington, Va.
RESTRUCTURING OF THE PROCESS OF VISUAL RECOGNITION AS PERCEPTION CONDITIONS ALTER Abstract Only

V. M. KROL and Y. I. BONDAR *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-011)* p 70 26 Feb. 1985 Transl. into ENGLISH from *Zh. Vyssh. Nervnoy Deyatelnosti imeni I. P. Pavlova* (Moscow), v. 34, no. 5, Sep. - Oct. 1984 p 975-977

Avail: NTIS HC A05/MF A01

Two series of experiments were performed. The purpose of the first was to compare the course of the process of recognition of test signals in situations in which test subjects were previously familiarized with the test and knew what signals would be presented, or when they were not familiar with the alphabet of images used. In the second series of experiments a procedure of doubling the exposure of test figures was used. During the first portion of each experiment the time of presentation of the tests was gradually increased. After the threshold of the stage of identification was reached, the time of presentation was increased again, though in neither case were the test subjects informed what image would be presented. The results of both series showed that perception of test figures under conditions such that subjects know their form and position as in the first series or following preliminary activation of their perceptive description as in the second series involves statistically reliable reduction of the threshold of most stages of the recognition process. This indicates a change in the time characteristics of the individual stages of perception. B.W.

N85-19627# Joint Publications Research Service, Arlington, Va.
METHODS OF MONITORING MENTAL WORK EFFICIENCY, EMOTIONAL ACTIVITY

K. R. STAVITSKIY and N. A. GOSUDAREV *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-009)* p 22-26 19 Feb. 1985 refs Transl. into ENGLISH from *Gigiyena i Sanit.* (Moscow), no. 11, Nov. 1984 p 48-49

Avail: NTIS HC A04/MF A01

A method is presented for monitoring the mental work efficiency of a person by measuring the electroencephalogram constant component. Another method for determining the level of emotional activity by galvanic skin response techniques is also discussed. The central nervous system is monitored as an index of fatigue.

R.S.F.

N85-19640* Federation of American Societies for Experimental Biology, Bethesda, Md. Life Sciences Research Office.

RESEARCH OPPORTUNITIES IN HUMAN BEHAVIOR AND PERFORMANCE

J. M. CHRISTENSEN, ed. and J. M. TALBOT, ed. Jan. 1985 77 p refs (Contract NASW-3924) (NASA-CR-175473; NAS 1.26:175473) Avail: NTIS HC A05/MF A01 CSCL 051

Extant information on the subject of psychological aspects of manned space flight are reviewed; NASA's psychology research program is examined; significant gaps in knowledge are identified; and suggestions are offered for future research program planning. Issues of human behavior and performance related to the United States space station, to the space shuttle program, and to both near and long term problems of a generic nature in applicable disciplines of psychology are considered. Topics covered include: (1) human performance requirements for a 90 day mission; (2) human perceptual, cognitive, and motor capabilities and limitations in space; (3) crew composition, individual competencies, crew competencies, selection criteria, and special training; (4) environmental factors influencing behavior; (5) psychosocial aspects of multiperson space crews in long term missions; (6) career determinants in NASA; (7) investigational methodology and equipment; and (8) psychological support.

A.R.H.

N85-19641# Naval Submarine Medical Research Lab., Groton, Conn.
INDIVIDUAL DIFFERENCES IN CHROMATIC BRIGHTNESS MATCHING Interim Report

S. M. LURIA and D. F. NERI 3 Oct. 1984 17 p (AD-A148882; AD-E850737; NSMRL-1031) Avail: NTIS HC A02/MF A01 CSCL 20F

Individual differences in brightness matches between lights of different colors were determined for color-normal observers at both photopic and mesopic light levels using the method of flicker photometry. The standard deviations of the settings made by 52 observers at photopic levels did not exceed 0.1 log unit. Variability was greatest at the extremes of the spectrum. Variability was not appreciably increased at mesopic levels. GRA

N85-19642# Naval Submarine Medical Research Lab., Groton, Conn.

THE RELATIVE EFFECTIVENESS OF RED AND WHITE LIGHT FOR SUBSEQUENT DARK-ADAPTATION Interim Report

S. M. LURIA and D. A. KOBUS 3 Jul. 1984 25 p (AD-A148883; AD-E850737; NSMRL-1036) Avail: NTIS HC A02/MF A01 CSCL 06P

The literature concerning the effectiveness of red and white light for permitting subsequent dark-adaptation is reviewed. Although red light is clearly superior to white, its advantage decreases as intensity decreases, and at levels of ambient light found in submarine compartments, its superiority over white is probably not of practical significance in most situations. Considering the disadvantages of red light, it is concluded that low level white light is preferable to red light as general night-time ambient illumination. GRA

N85-19643# Clemson Univ., S.C. Dept. of Psychology.
MULTIPLE RESOURCES AND BRAIN LATERALITY Final Report, 1 May 1983 - 1 May 1984
E. H. GALLUSCIO 6 Jun. 1984 24 p (Contract AF-AFOSR-0155-83) (AD-A148912; AFOSR-84-1125TR) Avail: NTIS HC A02/MF A01 CSCL 06P

Two studies were completed to test the multiple resources model of information processing using tachistoscopic lateralized-input techniques. In Exp. 1 37 normal, dextral subjects, 18 men aged 18-21 yr. and 19 women 18-21 yr. responded manually to a visuo-spatial and verbal dual-task presented simultaneously to left and right brain or non-laterally. Both men and women tended to have superior performance with coherent lateral input. However, differences in task difficulty and the possibility of a left to right scanning advantage with lateral input made interpretation of the data tenuous. In the second experiment the difficulty of the two tasks were made more equal and a third viewing condition, having noncoherent lateral input, was included. Twenty normal, dextral subjects 10 men aged 18-21 yr. and 10 women 19-21 yr. were tested under all three viewing conditions. Both men and women had superior performance with coherent lateral input compared to the other two viewing conditions. The results were viewed as supporting the notion that each hemisphere has separate and unique pools of resources, that the resources of one or both hemispheres may be functional in processing a given task, and that in dual-task situations the brain operates most efficiently accurately with direct access of appropriate tasks to each hemisphere. Author (GRA)

N85-19644# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.

SELECTING ONE AMONG THE MANY: A SIMPLE NETWORK IMPLEMENTING SHIFTS IN SELECTIVE VISUAL ATTENTION

C. KOCH and S. ULLMAN Jan. 1984 21 p (Contract N00014-80-C-0505) (AD-A148989; AD-E301513; AI-M-770) Avail: NTIS HC A02/MF A01 CSCL 05J

This study addresses the question of how simple networks can account for a variety of phenomena associated with the shift of a specialized processing focus across the visual scene. We

53 BEHAVIORAL SCIENCES

address in particular aspects of the dichotomy between the preattentive-parallel and the attentive-serial modes of visual perception and their hypothetical neuronal implementations. Specifically, we propose the following; (1) a number of elementary features, such as color, orientation, direction of movement, disparity etc. are represented in parallel in different topographical maps, called the early representation; (2) there exists a selective mapping from this early representation into a more central representation, such that at any instant the central representation contains the properties of only a single location in the visual scene, the selected location; (3) we discuss some selection rules that determine which location will be mapped into the central representation. The major rule, using the saliency or conspicuity of locations in the early representation, is implemented using a so-called winner-take-all network. A hierarchical pyramid-like architecture is proposed for this network. We suggest possible implementations in neuronal hardware, including a possible role for the extensive back-projection from the cortex to the LGN. GRA

N85-19645# California Univ., Berkeley. Lawrence Berkeley Lab. Applied Science Div.

ANALYSIS OF A VISUAL PERFORMANCE EXPERIMENT

R. CLEAR and S. BERMAN Jul. 1984 25 p refs Presented at the Illum. Eng. Soc. Ann. Conf., St. Louis, 6-9 Aug. 1984 (Contract DE-AC03-76SF-00098) (DE85-000710; LBL-17763; CONF-840817-2) Avail: NTIS HC A02/MF A01

The Smith-Rea check value verification experiment was reanalyzed. This experiment is one of the 20 experiments used to support the CIE 19/2 model. A preliminary data sheet from Smith and Rea listed an incorrect score function and contained a large number of arithmetic errors in converting raw times to scores. Correction of these errors changes the CIE fit. It is argued that the W123 parameter of this fit is not related to the critical visual processes as claimed. The corrected data are used to examine basic trends. Subjects achieved their maximum scores for a large fraction of runs under all visibility conditions. There was no statistically significant difference in scores for tests from 100 to 5000 lux. Furthermore, illumination level was less important to performance than the other variables studied: subject, practice, and check set (legibility and contrast). The RQQ no. 6 recommended illumination levels for such tasks range from 200 to 750 lux, indicating that recommended levels may overstate the need for illumination. DOE

54

MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

A85-22590

LASER OPTOMETRIC ASSESSMENT OF VISUAL DISPLAY VIEWABILITY

G. M. MURCH (Tektronix, Inc., Information Display Div., Wilsonville, OR) IN: Advances in display technology III; Proceedings of the Meeting, Los Angeles, CA, January 18, 19, 1983 . Bellingham, WA, SPIE - The International Society for Optical Engineering, 1983, p. 6-11. refs

Through the technique of laser optometry, measurements of a display user's visual accommodation and binocular convergence were used to assess the visual impact of display color, technology, contrast, and work time. The studies reported here indicate the potential of visual-function measurements as an objective means of improving the design of visual displays. Author

A85-22592

HUMAN PERFORMANCE EVALUATIONS OF DIGITAL IMAGE QUALITY

B. P. CHAO, R. J. BEATON, and H. L. SNYDER (Virginia Polytechnic Institute and State University, Blacksburg, VA) IN: Advances in display technology III; Proceedings of the Meeting, Los Angeles, CA, January 18, 19, 1983 . Bellingham, WA, SPIE - The International Society for Optical Engineering, 1983, p. 20-24. (Contract F49620-80-C-0057)

This paper reports some of the findings of a research program aimed at investigating the effects of digital image quality upon human performance. Two image quality dimensions, blur and noise, along with three display systems were studied by employing two human performance tasks. The results, in conjunction with the evaluation of enhancement/restoration techniques provide useful information for digital imaging system and subsystem designers. Author

A85-22755

USAF AEROSPACE BIOTECHNOLOGY RESEARCH AND DEVELOPMENT

D. I. CARTER (USAF, Aerospace Medical Div., Brooks AFB, TX) IN: SAFE Association, Annual Symposium, 21st, San Antonio, TX, November 5-8, 1983, Proceedings . Van Nuys, CA, SAFE Association, 1984, p. 37-42.

In matters of crew safety and life support, the U.S. Air Force's Aerospace Biotechnology Program is primarily concerned with the human capacity to withstand the stresses, and survive the hazards, arising in high performance military aircraft. The Aerospace Medicine Research Program furnishes aircrav selection and retention standards and develops methods for the enhancement of aircrav capabilities. The Crew Technology Program aims to make crew performance standards meet or exceed the limits of operational aircraft, through life support equipment and procedures integration. Standards, specifications, concepts and systems related to new flight regimes, as well as advanced emergency escape technology, are the concern of the Biodynamics program. Man-machine integration efforts and chemical warfare protection efforts have also been undertaken. An onboard oxygen generation system is currently under development. O.C.

A85-22756

USAFSAM INTEGRATION LABORATORY ASSESSMENTS OF THE ADVANCED CHEMICAL DEFENCE AIRCREW RESPIRATOR (ACDAR)

P. H. R. GILL (USAF, School of Aerospace Medicine, Brooks AFB, TX) IN: SAFE Association, Annual Symposium, 21st, San Antonio, TX, November 5-8, 1983, Proceedings . Van Nuys, CA, SAFE Association, 1984, p. 48-52.

The Advanced Chemical Defence Aircrew Respirator (ACDAR) as provided under contract with the Scott Sierra Corporation was evaluated by the USAF School of Aerospace Medicine, Cockpit and Equipment Integration Laboratory during May 1983. The ACDAR is an under-the-helmet hooded chemical defence respirator based on the MBU-12/P oxygen mask, and was designed for integration with the tactical HGU-55/P lightweight helmet. The system incorporates separately a filtered blown air supply to the hood, and a filter cannister assembly capable of accepting NATO standard filters. Author

A85-22759

RESTRAINT IMPROVEMENT RETROFIT PROGRAM - OBJECTIVES AND REQUIREMENTS

M. SCHWARTZ (U.S. Naval Material Command, Naval Air Development Center, Warminster, PA) IN: SAFE Association, Annual Symposium, 21st, San Antonio, TX, November 5-8, 1983, Proceedings . Van Nuys, CA, SAFE Association, 1984, p. 75-78.

Attention is given to progress made to date in a U.S. Navy-directed program for the development of improved and novel crew restraint subsystem components that can be retrofitted into existing crew escape systems. Restraint system improvements are to encompass maneuvering and ejection, and should improve logistics supportability. Development hardware items that have been

constructed and tested include a seat-mounted harness, an acceleration-sensitive inertia reel lock, and an inflatable bladder restraint-tensioning device.

O.C.

A85-22761

**LIFE SUPPORT SYSTEM PROGRAM OFFICE - 1983
CORPORATE REPORT**

R. C. JAMESON (USAF, Life Support System Program Office, Wright-Patterson AFB, OH) IN: SAFE Association, Annual Symposium, 21st, San Antonio, TX, November 5-8, 1983, Proceedings . Van Nuys, CA, SAFE Association, 1984, p. 92-94.

Attention is given to the status of U.S. Air Force RDT&A programs concerned with development of chemical defense systems for aircrews, the Advanced Concept Ejection Seat, the On-Board Oxygen-Generating System, the Survival Avionics System, a high performance anti-G valve, lead lanthanum zirconate titanate thermal flash blindness goggles, and lightweight helmets. Emphasis is placed on chemical defense systems, among which the Survivable Collective Protection System, which will provide 'shirt sleeve environment' protection from chemicals, has already undergone development testing.

O.C.

A85-22763

REINFORCEMENT KEVLAR OR FIBERGLASS IN THE HGU HELMET SHELL

LE THAI HUYEN (USAF, San Antonio Air Logistics Center, Kelly AFB, TX) IN: SAFE Association, Annual Symposium, 21st, San Antonio, TX, November 5-8, 1983, Proceedings . Van Nuys, CA, SAFE Association, 1984, p. 98-100. refs

Recent attempts at further crew helmet shell weight reduction have encountered strength retention problems whose solution is presently undertaken by means of novel reinforcing fabric layup techniques. It is noted that 30-40 percent of helmet shell weight can be reduced through replacement of glass fiber reinforcement by Kevlar. The layup technique presented enhances interlaminar shearing forces in the helmet shell.

O.C.

A85-22770

IMPROVING HEAD CRASH PROTECTION

V. R. HODGSON (Wayne State University, Detroit, MI) IN: SAFE Association, Annual Symposium, 21st, San Antonio, TX, November 5-8, 1983, Proceedings . Van Nuys, CA, SAFE Association, 1984, p. 157-160. refs

Recent advances in understanding of serious head injury risk as a function of Head Injury Criterion (HIC) level; the development of a more human-like head model in shape, mass distribution and impact response; and information from a field accident study, make it apparent that the impact standards for helmets should be changed. Drop test results are given to show how the available energy absorber space in a typical Snell approved helmet can be made more efficient and more closely matched to human tolerance by using these new biomechanical tools.

Author

A85-22771

IMMERSION SUITS, PAST AND PRESENT

J. M. HAWKINS (Beaufort Air-Sea Equipment, Ltd., Birkenhead, Cheshire, England) IN: SAFE Association, Annual Symposium, 21st, San Antonio, TX, November 5-8, 1983, Proceedings . Van Nuys, CA, SAFE Association, 1984, p. 169, 170.

The evolution and features of military and commercial immersion suits are traced from those designed to protect pilots who operated from merchant ships in 1942 and were downed over the ocean. The earliest suits were leather and both kept water out and perspiration in. The Mk.6 military suit was developed by 1951 and consisted of a cotton fabric that permitted the passage of air but not water. Refinements made the suit lighter while retaining seals at the extremities. The Mk.10 one-piece suit, introduced in 1968 and still in use, features integral waterproof socks and entrance through a diagonal waterproof zip fastener. Trials are under way with an equivalent undergarment which will be amenable to external anti-g trousers. A commercial nylon suit interfaces with a neoprene hood at a waterproof neck seal. Another version of the suit is

stowed near liferafts and has a quilted lining for warmth and buoyancy and is easy to don in any situation.

M.S.K.

A85-22772

A COMPUTER MODEL FOR PREDICTION OF PILOT PERFORMANCE BASED ON THE ADDITION OF DIFFERENT WEIGHTS AT VARIOUS LOCATIONS ON THE HEAD

M. I. DARAH and R. W. KRUTZ, JR. (Technology, Inc., Life Sciences Div., San Antonio, TX) IN: SAFE Association, Annual Symposium, 21st, San Antonio, TX, November 5-8, 1983, Proceedings . Van Nuys, CA, SAFE Association, 1984, p. 177-179. refs

A simulation model was devised for performing human factors research into the performance envelope of the pilot, helmet and life support equipment in the high-g environment of modern jets. The model accounts for the impact of helmet weight in high-g stresses by considering the physiological tolerances of the head/neck functions. A mechanical systems approach was taken for the musculoskeletal structure, treating it in terms of rodlike members and a number of fulcrums and their known tolerances. Moment equations were derived for point forces in several locations and attention was given to the cockpit space constraints imposed by life support equipment. The model calculated the g-force, segment weights and forces, the percent maximum muscular effort, body orientation, available range of motion, arterial oxygen tension and heart rate, fatigue factor, and the physiological state of the pilot. Sample results for flight in an F-16 indicate that limits are needed on the performance envelope of modern aircraft. M.S.K.

A85-22773

ADVANCED EMERGENCY BREATHING SYSTEMS

J. W. CASTINE (U.S. Naval Material Command, Aircraft and Crew Systems Technology Directorate, Warminster, PA) IN: SAFE Association, Annual Symposium, 21st, San Antonio, TX, November 5-8, 1983, Proceedings . Van Nuys, CA, SAFE Association, 1984, p. 187-193.

The Naval Air Development Center has formulated concepts for advanced breathing systems. These systems employ state-of-the-art technology components currently in production or under development such as high pressure (10,000 psi) air bottles, solid chemical oxygen sources, on-board oxygen generation systems and antisuffocation valves. This paper will describe these components as well as defining system concepts for use in both fixed wing ejection seat and rotary wing aircraft.

Author

A85-22775

U.S. NAVY AVIATION MISHAP AIRCREW ANTHROPOMETRY - 1 JANUARY 1969 THROUGH 31 DECEMBER 1979

F. C. GUILL (U.S. Naval Air Systems Command, Crew Systems Div., Washington, DC) IN: SAFE Association, Annual Symposium, 21st, San Antonio, TX, November 5-8, 1983, Proceedings . Van Nuys, CA, SAFE Association, 1984, p. 201-216.

Anthropometric statistics generated from a survey of accident reports filled out by flight medical examiners for 9671 U.S. Navy aircrew involved in air accidents were examined for accuracy and found to be seriously distorted and/or incomplete. The study was conducted to discover anthropometric factors which may have precipitated the accidents due to crew-equipment mismatches. Efforts were expended to identify the precise events which caused the accidents. However, a disproportionate number of height, weight and age factors had been recorded, to the exclusion of other normally required data. Furthermore, the data which were recorded often described aircrew with bizarre body dimensions, due either to carelessness in the original document or during transcription of the data into a computerized database. Several techniques are discussed for ensuring that the flight medical examiners will in the future furnish more accurate and complete data and thereby enhance the capabilities of human factors engineers to design safer operational and emergency equipment and environments.

M.S.K.

A85-23123

SPACESUIT DEVELOPMENT - THE AMERICAN EXPERIENCE

K. T. WILSON British Interplanetary Society, Journal (Space Chronicle) (ISSN 0007-084X), vol. 38, Feb. 1985, p. 51-61. refs

The history of development of space suits in the U.S. is traced and illustrated with photographs. The first pressure suits developed for aviators in the 1930s and 1940s are described; the adaptation of similar designs to space use in the Mercury program is recounted; and the Gemini, Apollo, and Space Shuttle improvements (including increased mobility, EVA capability, and reusability) are explained. Future suits which eliminate the need for time-consuming prebreathing procedures and provide head-up displays and two-hand tool operation to facilitate repair operations are briefly considered. T.K.

A85-23162

ALGORITHM FOR THE COMPUTER IDENTIFICATION AND PROCESSING OF THE PSYCHOPHYSIOLOGICAL PARAMETERS OF HUMAN OPERATORS IN A TRACKING PROCESS [ALGORITM VYDELENIIA I OBRABOTKI S POMOSHCH'IU EVM PSIKHOFIZIOLOGICHESKIKH PARAMETROV CHELOVEKA-OPERATORA V PROTSESE SLEZHENIIA]

V. I. DAVYDOV IN: Methodology and techniques of psychophysiological studies of operator activity. Moscow, Izdatel'stvo Nauka, 1984, p. 70-75. In Russian.

An algorithm is presented for identifying the main psychophysiological parameters of a human operator from recordings of the magnitude of mismatch between the tracker and the mark in a tracking process. The recording of this mismatch by means of an ordinary stereophonic magnetic tape recorder is considered, and a method for the inputting of the tracking data into the ES-1020 computer for further processing is described.

B.J.

A85-23166

A METHOD FOR COMPARING THE SIMPLE SENSORIMOTOR RESPONSES OF INTERACTING OPERATORS [OB ODNOM METODE SRAVNENIIA PROSTYKH SENSO-MOTORNYKH REAKTSII VZAIMODEISTVUIUUSHCHIKH OPERATOROV]

I. V. LARIN IN: Methodology and techniques of psychophysiological studies of operator activity. Moscow, Izdatel'stvo Nauka, 1984, p. 94-97. In Russian. refs

The design of a device for the complex assessment of the operation of interacting operators (i.e., the overall assessment of time parameters) is described, and a method for the training of operators on the basis of simplified programs is proposed. The device employs two programs: (1) a mode of competitive interaction of two operators, comparing their achievements with respect to feedback indices; and (2) a mode of operation of one operator, comparing (with respect to a feedback circuit) his readings with a 'reaction time' established by the researcher. A functional scheme of the proposed device is presented.

B.J.

A85-23197*# National Aeronautics and Space Administration, Langley Research Center, Hampton, Va.

A SYSTEM-LEVEL APPROACH TO AUTOMATION RESEARCH

F. W. HARRISON and N. E. ORLANDO (NASA, Langley Research Center, Flight Dynamics and Control Div., Hampton, VA) University of Alabama in Huntsville and University of Alabama in Birmingham, Annual Robotics Conference, 4th, University of Alabama, Huntsville, AL, Apr. 26, 1984, Paper. 17 p. refs

Automation is the application of self-regulating mechanical and electronic devices to processes that can be accomplished with the human organs of perception, decision, and actuation. The successful application of automation to a system process should reduce man/system interaction and the perceived complexity of the system, or should increase affordability, productivity, quality control, and safety. The expense, time constraints, and risk factors associated with extravehicular activities have led the Automation Technology Branch (ATB), as part of the NASA Automation Research and Technology Program, to investigate the use of robots and teleoperators as automation aids in the context of space

operations. The ATB program addresses three major areas: (1) basic research in autonomous operations, (2) human factors research on man-machine interfaces with remote systems, and (3) the integration and analysis of automated systems. This paper reviews the current ATB research in the area of robotics and teleoperators.

Author

A85-23198#

HUMAN FACTORS IN ROBOTICS

H. M. PARSONS (Essex Corp., Alexandria, VA; Lehigh University, Bethlehem, PA) University of Alabama in Huntsville and University of Alabama in Birmingham, Annual Robotics Conference, 4th, University of Alabama, Huntsville, AL, Apr. 26, 1984, Paper. 23 p. refs

The present investigation is concerned with possible contributions of human factors engineering to robotics. Engelberger (1974) applied the term 'symbiosis' to robotics to indicate that humans were and would be working jointly with robots. Aspects of such a 'symbiosis' are discussed, and a description of human factors engineering techniques is presented, taking into account interface design, workplace layout, ambient conditions, safety, procedures and manuals, installation and testing, skill and training requirements, and job design. It is pointed out that in terms of visible events, human factors engineering has been involved in robotics for no more than five years. Developments occurring in connection with such an involvement are discussed.

G.R.

A85-23270

EXPERIENCE WITH A CENTRALIZED PROVISION FOR INDIVIDUAL RADIATION-DOSE MONITORING [OPYT TSENTRALIZOVANNOGO OBESPECHENIIA INDIVIDUAL'NOGO DOZIMETRICHESKOGO KONTROLIA]

A. V. EPISHIN, V. I. BUSOV, and V. I. KULAGIN Gigiena i Sanitaria (ISSN 0016-9900), Oct. 1984, p. 63, 64. In Russian.

A85-23273

INVESTIGATION OF THE DYNAMICS OF THE AUTOMICROFLORA OF THE SKIN AND FAUCES, AND THE BACTERIAL CONTAMINATION OF THE UNDERCLOTHES OF MINE WORKERS [IZUCHENIE DINAMIKI AUTOMIKROFLORY KOZMI, ZEVA I BAKTERIAL'NOGO ZAGRIAZNENIIA BEL'IA PODZEMNYKH GORNYKH RABOCHIKH]

O. IU. KOZLOV, N. N. VASKEVICH, and T. I. KASIANOVA (Tsentral'nyi Nauchno-Issledovatel'skii i Proektno-Konstruktorskii Institut Profilaktiki Pnevmonokoniozov i Tekhniki Bezopasnosti, Berezovskii, USSR) Gigiena i Sanitaria (ISSN 0016-9900), Oct. 1984, p. 88, 89. In Russian. refs

A85-23304

AN ANALYSIS OF LIGHT AND TECHNICAL PARAMETERS FOR VISUAL ACUITY MEASUREMENT DEVICES AND SOME METHODS FOR THEIR STANDARDIZATION [ANALIZ IDENTIFIKATSII SVETOTEKHNICHEKIH PARAMETROV V PРИBORAKH DLIA PROVERKI OSTROTY ZRENIIA I PUTI IKH STANDARTIZATSII]

V. F. ANANIN and V. M. TSYRENOV Oftal'mologicheskii Zhurnal (ISSN 0030-0675), no. 6, 1984, p. 363-366. In Russian. refs

A85-23315

METHODOLOGICAL PROBLEMS OF MAN-MACHINE INTERACTION IN THE SOLUTION OF MATHEMATICAL PROBLEMS [METODOLOGICHESKIE PROBLEMY CHELOVEKO-MASHINNNOGO VZAIMODEISTVIIA V RESHENII MATEMATICHESKIKH ZADACH]

I. G. KODRIANU (Kishinevskii Gosudarstvennyi Pedagogicheskii Institut, Kishinev, Moldavian SSR) Filosofskie Nauki (ISSN 0015-1858), no. 3, 1984, p. 95-102. In Russian. refs

A85-23811* Grumman Aerospace Corp., Bethpage, N.Y.
AN OVERVIEW OF MEDICAL-BIOLOGICAL RADIATION HAZARDS IN EARTH ORBITS

M. C. STAUBER, M. L. ROSSI (Grumman Research and Development Center, Bethpage, NY), and E. G. STASSINOPOULOS (NASA, Goddard Space Flight Center, Greenbelt, MD) IN: Space safety and rescue 1982-1983, including worldwide disaster response, rescue and safety employing space-borne systems; Proceedings of the Fifteenth and Sixteenth International Symposia, Paris, France, September 27-October 2, 1982 and Budapest, Hungary, October 10-15, 1983. San Diego, CA, Univelt, Inc., 1984, p. 267-301. refs
 (IAF PAPER 83-256)

The radiation exposure of crew members on space missions in LEO and GEO is evaluated in a general review. The radiation environment is characterized, taking the trapped radiation belts, solar flares, Galactic and solar cosmic rays, and secondary radiation into account and emphasizing the increased dosages produced by transient phenomena such as solar flares. The biological effects of space radiation in the individual cells, on the body as a whole, and on critical organs are summarized, and the exposure limits and shielding specifications (for spacecraft and for EVA suits) currently used by US mission planners are reviewed. For GEO, 4-g/sq cm Al-equivalent shielding is considered adequate under normal conditions, making EVA in this volatile environment questionable; for anomalously large solar flares, emergency shelter within 10-g/sq cm walls or the capability to retreat to a lower orbit is necessary.

T.K.

A85-24030

EFFECT OF RANDOM PERTURBATIONS ON THE CONTROLLABILITY DOMAIN IN ERGATIC DYNAMIC SYSTEMS
[O VLIIANII SLUCHAINYKH VOZMUSHCHENII NA OBLAST' UPRAVLIAEMOSTI V ERGATICHESKIKH DINAMICHESKIKH SISTEMAKH]

L. N. DEGTARENKO and V. N. PANFEROV (Kievskii Institut Inzhenerov Grazhdanskoi Aviatsii, Kiev, Ukrainian SSR) Kibernetika i Vychislitel'naia Tekhnika (ISSN 0454-9910), no. 61, 1984, p. 13-19. In Russian. refs

An algorithm is developed for analyzing the effect of random perturbations of the atmosphere and random perturbations caused by the pilot on the size of the flight controllability domain (CD) of an aircraft. It is shown that random perturbations of the atmosphere are equivalent to random perturbations due to the pilot from the standpoint of changes (reduction and narrowing) of the CD of the aircraft.

B.J.

A85-24031

ESTIMATION OF THE EFFICIENCY OF TWO-GOAL DIFFERENTIAL-GAME ERGATIC CONTROL SYSTEMS
[OTSENKA EFFEKTIVNOSTI DVUKHTSELEVYKH DIFFERENTSIAL'NO-IGROVYKH ERGATICHESKIKH SISTEM UPRAVLENIIA]

IU. V. TSURKAN (Akademii Nauk Ukrainskoi SSR, Institut Kibernetiki, Kiev, Ukrainian SSR) Kibernetika i Vychislitel'naia Tekhnika (ISSN 0454-9910), no. 61, 1984, p. 28-30. In Russian.

A85-24032

ASSESSMENT OF THE WORK CAPACITY OF ERGATIC SYSTEMS
[K VOPROSU OTSENKI RABOTOSPOSOBNOSTI ERGATICHESKIKH SISTEM]

V. V. PAVLOV, A. M. MELESHEV, and D. I. PALEICHUK (Akademii Nauk Ukrainskoi SSR, Institut Kibernetiki, Kiev, Ukrainian SSR) Kibernetika i Vychislitel'naia Tekhnika (ISSN 0454-9910), no. 61, 1984, p. 34-37. In Russian.

A method for the operational monitoring of the work capacity of aggregates and the human operator in an ergatic control system is proposed. The method is based on the use of information about variations of the characteristics of the subthreshold signal, contained in the output signal of the system aggregate.

B.J.

A85-24033

A METHODOLOGY FOR DETERMINING THE PARAMETERS OF A PILOT AS AN INFORMATION-PROCESSING CONTROL SYSTEM
[OB ODNOI METODOLOGII OPREDELENIIA PARAMETROV PILOTA KAK INFORMATSIONNO-PROTSESSORNOI SISTEMY UPRAVLENIIA]

A. A. TERESHKIN (Kievskii Institut Inzhenerov Grazhdanskoi Aviatsii, Kiev, Ukrainian SSR) Kibernetika i Vychislitel'naia Tekhnika (ISSN 0454-9910), no. 61, 1984, p. 48-56. In Russian. refs

A methodology for determining the main parameters of a human operator is proposed which is free from the difficulties connected with multiparametric optimization. Experimental studies performed on groups of pilots are examined, and attention is given to the short-term memory, complexity, and level of relative organization of pilots considered as information-processing control systems.

B.J.

A85-24034

SIMULATION OF PILOT ACTIVITY ON THE BASIS OF ONBOARD-RECORDER DATA
[MODELIROVANIE DEIATEL'NOSTI PILOTA PO DANNYM BORTOVYKH SAMOPISTSEV]

V. N. GOLEGO, V. A. KOROTEEV, and V. V. SEMKO (Kievskii Institut Inzhenerov Grazhdanskoi Aviatsii, Kiev, Ukrainian SSR) Kibernetika i Vychislitel'naia Tekhnika (ISSN 0454-9910), no. 61, 1984, p. 57-62. In Russian.

A method is proposed for developing a mathematical model describing the activity of a human operator (a pilot) in the case of the multichannel control of a dynamic plant. The model is specified in the form of autonomous blocks, for which the structure and makeup of the characteristic vectors are determined by the method of evolutionary search. An example involving the construction of a pilot model in a class of algebraic functions is considered.

B.J.

A85-24035

CERTAIN PROBLEMS IN THE AUTOMATED ASSESSMENT OF THE OPERATING EFFICIENCY OF MAN-MACHINE SYSTEMS
[NEKOTORYE VOPROSY AVTOMATIZATSII OTSENKI EFFEKTIVNOSTI FUNKTSIONIROVANIIA SISTEM 'CHELOVEK-TEKHNIKA']

A. A. BEZBOGOV (Rizhskoe Vysshee Voennoe Aviatsionnoe Inzhenernoe Uchilishche, Riga, Latvian SSR) Kibernetika i Vychislitel'naia Tekhnika (ISSN 0454-9910), no. 61, 1984, p. 63-67. In Russian. refs

A generalized description is given of a man-machine system (MMS), its constituent parts (the human operator and the machine part), and their interactions. The problem of assessing the operating efficiency of MMSs is formulated, and the concept of objective assessment is defined. A classification of assessments of MMS operation is proposed, and structures of automated systems for the assessment of MMSs are presented.

B.J.

A85-24036

SIMULATION MODEL FOR ASSESSING THE COMBINED EFFECT OF ENGINEERING AND PSYCHOLOGICAL FACTORS ON THE EFFICIENCY OF A MAN-MACHINE SYSTEM
[IMITATSIONNAIA MODEL' Dlia OTSENKI KOMPLEKSNOGO VLIIANIIA INZHENERNO-PSIKHOLOGICHESKIKH FAKTOROV NA EFFEKTIVNOST' ERGATICHESKOI SISTEMY]

B. M. GERASIMOV, G. V. LOZHIN, S. V. SKRYL, and V. V. SPASENNIKOV (KVIR TU, USSR) Kibernetika i Vychislitel'naia Tekhnika (ISSN 0454-9910), no. 61, 1984, p. 88-93. In Russian. refs

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

A85-24037

INVESTIGATION OF THE GOAL-DIRECTED MOTIONS OF A HUMAN IN AN UNSUPPORTED STATE [ISSLEDOVANIE TSELENAPRAVLENNYKH DVIZHENII CHELOVEKA V BEZOPORNOM SOSTOIANII]

V. S. PRIDVOROV (Akademii Nauk SSSR, Institut Psichologii, Moscow, USSR) Kibernetika i Vychislitel'naia Tekhnika (ISSN 0454-9910), no. 61, 1984, p. 93-99. In Russian.

Methods of goal-directed mechanics (Korenev, 1974, 1977, and 1980) employing tensor analysis are used to develop a theory for the goal-directed motions of a hinged 15-element basis model of the human body in an unsupported state. Results of the computer simulation of the goal-directed motions of the model are presented. It is noted that the proposed theory can describe goal-directed motions in weightlessness.

B.J.

A85-24038

OPTIMIZATION OF PILOT-RETRAINING PROGRAMS WITH ALLOWANCE FOR THE INDIVIDUAL QUALITIES OF THE PILOTS [OPTIMIZATSIIA PROGRAMM PEREUCHIVANIIA PILOTOV S UCHETOM IKH INDIVIDUAL'NYKH KACHESTV]

E. V. MELNIKOV and B. V. GAIDAI (Kievskii Institut Inzhenerov Grazhdanskoi Aviatsii, Kiev, Ukrainian SSR) Kibernetika i Vychislitel'naia Tekhnika (ISSN 0454-9910), no. 61, 1984, p. 100-102. In Russian.

The psychological characteristics of pilots in retraining on the complex training simulator of the Tu-154 aircraft were determined using Abiturient-1 (A-1) instrumentation. The correlation coefficient between the rate of acquisition of skills as determined by A-1 and pilot training on the simulator was assessed. It is concluded that the hardware described can be of use in optimizing the time period needed for pilot retraining for new types of aircraft.

B.J.

A85-24291* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

REDUCTION OF DISPLAY ARTIFACTS BY RANDOM SAMPLING

A. J. AHUMADA, JR., D. C. NAGEL, A. B. WATSON (NASA, Ames Research Center, Moffett Field, CA), and J. I. YELLOTT, JR. (California, University, Irvine, CA) IN: Applications of digital image processing VI; Proceedings of the Meeting, San Diego, CA, August 23-26, 1983. Bellingham, WA, SPIE - The International Society for Optical Engineering, 1983, p. 216-221. refs

The application of random-sampling techniques to remove visible artifacts (such as flicker, moire patterns, and paradoxical motion) introduced in TV-type displays by discrete sequential scanning is discussed and demonstrated. Sequential-scanning artifacts are described; the window of visibility defined in spatiotemporal frequency space by Watson and Ahumada (1982 and 1983) and Watson et al. (1983) is explained; the basic principles of random sampling are reviewed and illustrated by the case of the human retina; and it is proposed that the sampling artifacts can be replaced by random noise, which can then be shifted to frequency-space regions outside the window of visibility. Vertical sequential, single-random-sequence, and continuously renewed random-sequence plotting displays generating 128 points at update rates up to 130 Hz are applied to images of stationary and moving lines, and best results are obtained with the single random sequence for the stationary lines and with the renewed random sequence for the moving lines.

T.K.

A85-24301

AN EVALUATION OF SYSTEM QUALITY METRICS FOR HARD-COPY AND SOFT-COPY DISPLAYS OF DIGITAL IMAGERY

R. J. BEATON, R. W. MONTY, and H. L. SNYDER (Virginia Polytechnic Institute and State University, Blacksburg, VA) IN: Applications of digital image processing VI; Proceedings of the Meeting, San Diego, CA, August 23-26, 1983. Bellingham, WA, SPIE - The International Society for Optical Engineering, 1983, p. 320-328. refs

An analysis of 16 quantitative models of system quality for hard-copy and soft-copy digital image displays is presented. The

results of the analysis show that the effects of system noise and blur degradation upon photointerpretation and subjective scaling performance can be predicted on an a priori basis with accuracies of as much as 85 percent. The complete results of the analysis are given in a table.

I.H.

A85-24302

A SIMPLE ANALYTIC EXPRESSION FOR THE CONTRAST SENSITIVITY OF THE HUMAN EYE AS A FUNCTION OF BRIGHTNESS

H. BOROUGH (Boeing Aerospace Co., Seattle, VA) IN: Applications of digital image processing VI; Proceedings of the Meeting, San Diego, CA, August 23-26, 1983. Bellingham, WA, SPIE - The International Society for Optical Engineering, 1983, p. 329-332.

A simple analytical approximation for human visual contrast sensitivity is derived. The approximation permits a calculation of sensitivity as a function of space frequency; and yields results within a range of uncertainty of about 20 percent in comparison with current techniques. The approximation is found to be applicable to contrasts of greater than 1 percent and space frequencies greater than 0.1 cycles per m/rad. The brightness limit of the approximation was 10 to the -4th ft/L. The theoretical results are compared with experimentally recorded sensitivity values, and the results are given in a graph.

I.H.

A85-24392

ELABORATED REICHARDT DETECTORS

J. P. H. VAN SANTEN and G. SPERLING (New York University, New York, NY) Optical Society of America, Journal, A: Optics and Image Science (ISSN 0740-3232), vol. 2, Feb. 1985, p. 300-321. refs

(Contract AF-AFOSR-80-0279)

Current theories regarding motion detectors in human vision assume that a motion detector involves the comparison of the outputs of two spatiotemporal filters. This general idea was originally formulated by Reichardt (1957) in the context of experiments on insects. In the original version, the detector had no spatial filters. Reichardt's detector formed the basis for a model proposed by van Santen and Sperling (1984), the elaborated Reichardt model, which included spatial input filters. The basic component of this model was an elaborated Reichardt detector (ERD). The ERD indicated the correct direction of motion for a drifting sinusoidal grating of any spatial or temporal frequency. The present investigation provides further theoretical and empirical results on several versions of the ERD, including ERD subunits, special cases, and generalizations.

G.R.

A85-25089* SRI International Corp., Menlo Park, Calif.

GENERATION-V DUAL-PURKINJE-IMAGE EYETRACKER

H. D. CRANE and C. M. STEELE (SRI International, Menlo Park, CA) Applied Optics (ISSN 0003-6935), vol. 24, Feb. 15, 1985, p. 527-537. refs

(Contract NIH-EY-010301; NAS2-9934)

Major advances characterize the Generation-V dual-Purkinje-image eyetracker compared with the Generation-III version previously described. These advances include a large reduction in size, major improvements in frequency response and noise level, automatic alignment to a subject, and automatic adjustment for different separation between the visual and optic axes, which can vary considerably from subject to subject. In a number of applications described in the paper, the eyetracker is coupled with other highly specialized optical devices. These applications include accurately stabilizing an image on a subject's retina; accurately simulating a visually dead retinal region (i.e., a scotoma) of arbitrary shape, size, and position; and, for clinical purposes, stabilizing the position of a laser coagulator beam on a patient's retina so that the point of contact is unaffected by the patient's own eye movements.

Author

A85-25509

COLLOQUIUM ON CONTROL STATIONS, COLOGNE, WEST GERMANY, OCTOBER 16, 17, 1984, REPORTS [KOLLOQUIUM 'LEITWARTEN', COLOGNE, WEST GERMANY, OCTOBER 16, 17, 1984, VORTRAEGE]

Colloquium sponsored by the Technischer Ueberwachungs-Verein Rheinland, Institut fuer Unfallforschung, and Deutsche Gesellschaft fuer Ortung und Navigation. Ortung und Navigation (ISSN 0474-7550), vol. 25, no. 3, 1984, 410 p. In German. For individual items see A85-25510 to A85-25516.

Various topics in orientation and navigation are addressed in this collection of papers. The subjects addressed include the control of nuclear propulsion, ship control, flight navigation, rail travel, and relevant technology. C.D.

A85-25511

THE MAN IN THE COCKPIT OF A MODERN COMMERCIAL AIRCRAFT [DER MENSCH IM COCKPIT EINES MODEREN VERKEHRSFLUGZEUGES]

P. H. HELDT (Deutsche Lufthansa AG, Cologne, West Germany) (Technischer Ueberwachungs-Verein Rheinland, Institut fuer Unfallforschung, and Deutsche Gesellschaft fuer Ortung und Navigation, Kolloquium 'Leitwarten', Cologne, West Germany, Oct. 16, 17, 1984) Ortung und Navigation (ISSN 0474-7550), vol. 25, no. 3, 1984, p. 467-474. In German. refs

The division of tasks between man and machine in the newest generation of commercial aircraft cockpits is discussed. The interaction of man with man, man with machine, man with software, and man with environmental conditions is addressed. The personal qualifications and training of pilots for work in the latest cockpits are briefly considered along with some points on error management. Operational experience since 1959 is briefly reviewed and discussed in the light of the necessity for further improvements in the interaction of pilot and crew with the aircraft. C.D.

A85-25512

ERROR MANAGEMENT METHODS IN THE COCKPITS OF HIGH-PERFORMANCE AIRCRAFT [METHODEN DES FEHLERMANAGEMENTS IM COCKPIT EINES HOCHLEISTUNGSFLUGZEUGES]

K. BRAUSER (Messerschmitt-Boelkow-Blohm GmbH, Munich, West Germany) (Technischer Ueberwachungs-Verein Rheinland, Institut fuer Unfallforschung, and Deutsche Gesellschaft fuer Ortung und Navigation, Kolloquium 'Leitwarten', Cologne, West Germany, Oct. 16, 17, 1984) Ortung und Navigation (ISSN 0474-7550), vol. 25, no. 3, 1984, p. 475-487. In German. refs

The compensation of operational errors in the cockpits of high-performance aircraft is discussed. The systematics of such errors is outlined in block diagrams and described, as are the methods for managing the errors. Methods for developing cockpit error management are addressed, including data analysis, simulations, and data banks. C.D.

A85-25514

BOUNDARY CONDITIONS OF WORK PLACE DESIGN IN FLIGHT OPERATION [RANDBEDINGUNGEN FUER DAS ARBEITSPLATZDESIGN IN DER FLUGFUEHRUNG]

E. KADEN (Telefunken AG, Ulm, West Germany) (Technischer Ueberwachungs-Verein Rheinland, Institut fuer Unfallforschung, and Deutsche Gesellschaft fuer Ortung und Navigation, Kolloquium 'Leitwarten', Cologne, West Germany, Oct. 16, 17, 1984) Ortung und Navigation (ISSN 0474-7550), vol. 25, no. 3, 1984, p. 509-515. In German.

The relationship of the system environment, configuration of the flight operation system, and interface with the pilot to the design of a work place for flight operations is discussed. The configuration of such a work place is addressed along with the development of the software and the division of tasks. C.D.

A85-25515

OVERSIGHT IN EUROCONTROL-CENTRAL, MAASTRICHT UAC [LEITWARTEN BEI DER EUROCONTROL-ZENTRALE, MAASTRICHT UAC]

W. H. ENDLICH (Eurocontrol, Brussels, Belgium) (Technischer Ueberwachungs-Verein Rheinland, Institut fuer Unfallforschung, and Deutsche Gesellschaft fuer Ortung und Navigation, Kolloquium 'Leitwarten', Cologne, West Germany, Oct. 16, 17, 1984) Ortung und Navigation (ISSN 0474-7550), vol. 25, no. 3, 1984, p. 534-554. In German. refs

The Technical Monitoring and Control System in Eurocontrol-Central is discussed. The control levels of the system and its work place design are considered, including the qualifications of personnel, error management, operational experience, and simulation results. C.D.

A85-25584

FORCE FEEDBACK IN A MANIPULATOR CONTROL SYSTEM [SILOVAIA OBRATNAIA SVIAZ' V SISTEME UPRAVLENIIA MANIPULATOROM]

V. S. GURFINKEL, E. A. DEVIANIN, A. V. LENSKII, S. B. MOZHIZHEVELOV, A. M. FORMALSKII, and A. IU. SHNEIDER (Akademii Nauk SSSR, Izvestia, Mekhanika Tverdogo Tela (ISSN 0572-3299), Nov.-Dec. 1984, p. 56-64. In Russian. refs

The paper is concerned with the problem of controlling the motion of a manipulator in making contact with an object and maintaining this contact with a specified force. The problem of the motion of a manipulator arm along the contour of an object whose shape is unknown a priori is also examined. Particular attention is given to the difficulties associated with the synthesis of force feedback during such operations, and methods of overcoming these difficulties are proposed. Optimal and quasi-optimal control algorithms are presented, and some specific operations are discussed. V.L.

A85-25986

T-45 TRAINING SYSTEM - CONCEPT AND ACQUISITION STRATEGY

W. J. CATLETT (U.S. Navy, Washington, DC) and R. G. GROWER (McDonnell Douglas Corp., St. Louis, MO) Society of Automotive Engineers, Aerospace Congress and Exposition, Long Beach, CA, Oct. 15-18, 1984. 7 p. (SAE PAPER 841588)

An account is given of the U.S. Navy's Full Scale Development program for the T-45 trainer aircraft, which attempts to work with the manufacturer within the Navy's schedule, priority, and affordability constraints. Acquisition of the T-45 is unique in being a closed loop system which has to demonstrate pilot production and cost-to-train advantages. In addition, program management has striven to encompass hardware, software, and 'courseware' from the Navy's curriculum guidelines. O.C.

N85-17983*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

THE EFFECTS OF TIME DELAY IN MAN-MACHINE CONTROL SYSTEMS: IMPLICATIONS FOR DESIGN OF FLIGHT SIMULATOR VISUAL-DISPLAY-DELAY COMPENSATION

D. F. CRANE /n AF Human Resources Lab. The IMAGE 3 Conf. Proc. p 331-343 Sep. 1984 Sponsored by NASA (AD-P004329) Avail: NTIS HC A22/MF A01 CSCL 01B

When human operators are performing precision tracking tasks, their dynamic response can often be modeled by quasilinear describing functions. That fact permits analysis of the effects of delay in certain man machine control systems using linear control system analysis techniques. The analysis indicates that a reduction in system stability is the immediate effect of additional control system delay, and that system characteristics moderate or exaggerate the importance of the delay. A selection of data (simulator and flight test) consistent with the analysis is reviewed. Flight simulator visual-display delay compensation, designed to restore pilot aircraft system stability, was evaluated in several studies which are reviewed here. The studies range from single-axis, tracking-task experiments (with sufficient subjects and trials to

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

establish the statistical significance of the results) to a brief evaluation of compensation of a computer generated imagery (CGI) visual display system in a full six degree of freedom simulation. The compensation was effective, improvements in pilot performance and workload or aircraft handling qualities rating (HQR) were observed. Results from recent aircraft handling qualities research literature, which support the compensation design approach, are also reviewed.

Author (GRA)

N85-18567# Joint Publications Research Service, Arlington, Va.
WORK CAPACITY OF HEAT AND ELECTRIC POWER PLANT OPERATIONS WORKING 12 HOUR DAY AND NIGHT SHIFTS

Abstract Only

A. O. NAVAKATIKYAN, V. V. KALNISH, and V. B. LASTOVCHENKO *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-007) p 63 6 Feb. 1985 Transl. into ENGLISH from Gigiyena i Sanit. (Moscow), no. 3, Mar. 1984, p 88-89*

Avail: NTIS HC A11

Various parameters of the CNS and cardiovascular system were analyzed in relation to work performance of 20 individuals employed 12 h day and night shifts at a heat and electric power plant. The subjects under study consisted of engineers and supervisors responsible for control and managing functions requiring a high rate of information processing. The results indicate that both daytime and nighttime shifts involved compensatory changes in the CNS and the cardiovascular systems. Cardiovascular stress was much more profound during the day shift, while CNS stress predominated during the night shift. These observations indicate inter-system interactions directed to favor the greater emphasis placed on the CNS at night to maintain wakefulness and alertness.

Author

N85-18568# Joint Publications Research Service, Arlington, Va.
SUCCESS IN LEARNING OCCUPATION OF CHEMICAL PRODUCTION TECHNICIAN AS FUNCTION OF CERTAIN PERSONALITY TRAITS AND DEVELOPMENT OF PSYCHOPHYSIOLOGICAL FUNCTIONS

Abstract Only
N. D. BOBRISHCHEVA-PUSHKINA *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-007) p 63-64 6 Feb. 1985 Transl. into ENGLISH from Gigiyena Tr. i Prof. Zabolevaniya (Moscow), no. 7, Jul. 1984 p 22-26*

Avail: NTIS HC A11

The influence of certain personality traits and the level of psychophysiological functions were studied with respect to the success of students in learning the occupation of chemical technician during studies and independent work. Forty-eight training school students, 17 to 19 years of age, were observed. Success was judged by questioning teachers and superiors on the job. The students' performance was measured over a period of 1 year. It was found that successful mastery of this occupation was combined with a low level of extroversion, neuroticism and alarm, well developed visual and operational memory, the ability to read the scales of instruments rapidly, deductive thinking, good concentration, and distribution and switching of attention. Persons who were easily alarmed did not master the occupational skills and abilities of the technician well and became easily fatigued during independent work. These skills and abilities can be used as prognostic tools in selecting personnel for training and employment as chemical technicians.

Author

N85-18569# Joint Publications Research Service, Arlington, Va.
STUDY OF BODILY FUNCTIONAL STATUS AND QUALITY OF CONTROLLING ACTION OF POWER UNIT OPERATORS WITH VARIOUS INTENSITIES OF LABOR

Abstract Only
Y. P. PALTSEV, A. V. KOSLESNIKOVA, L. I. LIPKINA, and D. K. FEDOTOV *In its USSR Rept.: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-007) p 64 6 Feb. 1985 Transl. into ENGLISH from Gigiyene Tr. i Prof. Zabolevaniya (Moscow), no. 8, Aug. 1984 p 37-42*

Avail: NTIS HC A11

Power unit operator's working conditions were studied. Results show that climate and light levels corresponded to the hygienic

standards. Sound levels were 7 to 9 dB above the standards at 250 to 8000 Hz. Bodily functional status, operational loads, and quality of control actions under normal working conditions were determined. Eight operators 27 to 36 years of age with at least one year in service at their occupation were studied. It was found that the need to concentrate attention and the high degree of responsibility, coupled with the monotonous nature of the work and insufficient physical activity, could decrease functional activity of the central nervous system and cause stress on the autonomic system. The negative influence of sensory monotony and hypokinesia should be reduced by increasing the number of active actions and motor loading on the body of the operators. R.S.F.

N85-18579*# Stanford Univ., Calif.

COLOR MEASUREMENT AND DISCRIMINATION

B. A. WANDELL Feb. 1985 82 p refs

(Contract NCC2-44)

(NASA-CR-3824; NAS 1.26:3824) Avail: NTIS HC A05/MF A01 CSCL 05H

Theories of color measurement attempt to provide a quantitative means for predicting whether two lights will be discriminable to an average observer. All color measurement theories can be characterized as follows: suppose lights a and b evoke responses from three color channels characterized as vectors, v(a) and v(b); the vector difference v(a) - v(b) corresponds to a set of channel responses that would be generated by some real light, call it *. According to theory a and b will be discriminable when * is detectable. A detailed development and test of the classic color measurement approach are reported. In the absence of a luminance component in the test stimuli, a and b, the theory holds well. In the presence of a luminance component, the theory is clearly false. When a luminance component is present discrimination judgements depend largely on whether the lights being discriminated fall in separate, categorical regions of color space. The results suggest that sensory estimation of surface color uses different methods, and the choice of method depends upon properties of the image. When there is significant luminance variation a categorical method is used, while in the absence of significant luminance variation judgments are continuous and consistent with the measurement approach.

M.G.

N85-18580# Army Natick Research and Development Command, Mass.

A SYSTEMS ANALYSIS OF ALTERNATIVE CONCEPTS FOR AIRCREW COLD WEATHER CLOTHING

Final Report

J. M. WALKER Mar. 1983 181 p

(Contract DA PROJ. 1L6-63747-D-669)

(AD-A148805; NATICK/TR-84/045) Avail: NTIS HC A09/MF

A01 CSCL 06Q

This analysis was performed in support of a requirement to develop a new clothing system for Army aircrews operating in regions where minimum winter temperatures are between 0 F (-17.8 C) and -60 F (-51.1 C). Each of five proposed clothing system concepts was evaluated to determine its feasibility and its effectiveness in satisfying the essential requirements specified in the Letter of Agreement. Two analytical models which simulate body cooling for various metabolic and environmental assumptions were used to determine the clothing insulation (clo) values required to provide thermal protection. Since the results indicated that auxiliary heated clothing items especially for the hands and feet will be necessary, an evaluation of potential power sources is included in the study. The report recommends that either two ensembles or a basic and an augmented version of the same ensemble be designed. The basic system will be worn in cold and intermediate cold regions and should be designed using state-of-the-art technology to protect to -15 F (-26.1 C). The other ensemble will be worn in extreme cold climates where temperatures can fall to -60 F (-51.1 C).

GRA

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

N85-18581# Army Construction Engineering Research Lab., Champaign, Ill.

CLOSED-LOOP CONCEPTS FOR THE ARMY: WATER CONSERVATION, RECYCLE, AND REUSE Final Report

E. D. SMITH, J. T. BANDY, W. P. GARDINER, and F. HUFF Nov. 1984 55 p
(Contract DA PROJ. 4A7-62720-A-896)

(AD-A148839; CERL-TR-N-85/01) Avail: NTIS HC A04/MF A01 CSCL 13B

Potential commitment of U.S. Army troops in the Middle East and Southwest Asia has raised the issue of water supply in the success of combat operations. Moreover, increased demands for water in the face of growing ground and surface water pollution, changes in global weather patterns, and expanding agriculture may affect the Army's mission in the future both at home and abroad. Coupled with increasing costs for potable water and outside wastewater treatment, this outlook suggests a clear need for conservative water use at Army installations. To update existing regulations for Department of Defense facilities, a closed-loop approach is proposed. Water conservation, recycling, and reuse in various combinations can be initiated to reduce the need for fresh water and simultaneously cut the cost of heating wasted water. The closed-loop measures applying to a given installation must be determined individually. Factors such as geography, climate, population numbers, and mission are assessed and then the feasibility of each conservation, recycle, and reuse measures is judged. Possibilities for using closed-loop technology are explored for several types of Army installations. GRA

N85-19606# Joint Publications Research Service, Arlington, Va.

WORK PHYSIOLOGY OF OPERATING PERSONNEL AT POWER PLANTS IN ARID REGIONS Abstract Only

I. M. MommadoV, A. G. GRIGORYAN, and G. A. TUPIKOVA *In its USSR Rept.*: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-008) p 22 13 Feb. 1985 Transl. into ENGLISH from Gigiyena Tr. i Prof. Zabolevaniya (Moscow), no. 10, Oct. 1984 p 50-51

Avail: NTIS HC A05/MF A01

Various physiological parameters were observed in July and August when the ambient temperature exceeded 40 C on a cohort of 20 40-year old, clinically healthy, males. Evaluation of the functional status of the different physiological systems demonstrates that heat is the key factor affecting physiological well-being. The combination of heat and performance requirements placed considerable stress on the homeostatic mechanisms, as reflected in greater energy expenditures for task accomplishment and earlier onset of fatigue. Physiological reserves are directed at maintenance of body temperature balance at the expense of muscular performance under the climatic conditions prevalent in the region. To ensure optimum job performance, exposure to high temperatures must be limited and isolated, air-conditioned, rest facilities must be provided. Workers must have appropriate nutrition, clothing, and vitamin supplements, physical conditioning, and other medical measures that enhance adaptation to arid climates. A.R.H.

N85-19608# Joint Publications Research Service, Arlington, Va.

EFFECTS OF OVERALL VIBRATION AND NOISE ON OPERATIONAL PERSONNEL Abstract Only

Y. N. KAMENSKIY *In its USSR Rept.*: Life Sci. Biomed. and Behavioral Sci. (JPRS-UBB-85-008) p 24 13 Feb. 1985 Transl. into ENGLISH fromm Gigiyena Tr. i Prof. Zabolevaniye (Moscow), no. 10, Oct. 1984 p 38-39

Avail: NTIS HC A05/MF A01

In order to substantiate recommendations for maximum permissible human exposure to vibration and noise, 10 clinically healthy males, 25 to 44 years of ages, underwent physiological studies to determine the effect of vibration (10 Hz, with 1 m/sq sec acceleration) or noise (90 dB), or a combination of both factors. Evaluation of the heart rate, muscular exertion tests, visual stimuli fusion test, coordination, visual tracking, etc., demonstrated that vibration has a more deleterious effect on the neuropsychological status of humans than does noise within the parameters tested.

In addition, in the vibration-noise combination, vibration may mask the noise intensity to 100 dB to 110 dB results in a summation of the adverse effects due to noise and vibration. Author

N85-19646*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Industrial Engineering and Operations Research.

IMPROVEMENT OF WORKLOAD ESTIMATION TECHNIQUES IN PILOTING TASKS Final Report, 1 Feb. 1983 - 14 Mar. 1984

W. W. WIERWILLE Mar. 1984 14 p refs
(Contract NAG2-17)

(NASA-CR-174374; NAS 1.26:174374) Avail: NTIS HC A02/MF A01 CSCL 05H

The Modified Cooper-Harper (MCH) scale has been shown to be a sensitive indicator of workload in several different types of aircrew tasks. The MCH scale, which is a 10 point scale, and five newly devised scales were examined in two different aircraft simulator experiments in which pilot loading was treated as an independent variable. The five scales included a 15 point scale, computerized versions of the MCH and 15 point scales, a scale in which the decision tree was removed, and one in which a 15 point left-to-right format was used. The results indicate that while one of the new scales may be more sensitive in a given experiment, task dependency is a problem. The MCH scale on the other hand exhibits consistent sensitivity and remains the scale recommended for general use. The MCH scale results are consistent with earlier experiments also. The results of the rating scale experiments are presented and the questionnaire results which were directed at obtaining a better understanding of the reasons for the relative sensitivity of the MCH scale and its variations are described.

R.S.F.

N85-19647# Computer Technology Associates, Inc., Englewood, Colo.

SECTOR SUITE MAN-MACHINE FUNCTIONAL CAPABILITIES AND PERFORMANCE REQUIREMENTS Final Report

AMMERMANN, ARDREY, BERGEN, BRUCE, FLIGG, JONES, KLOSTER, LENOROVITZ, PHILLIPS, and REEVES 10 Aug. 1984 410 p

(Contract DT-FA01-83-Y-10554)
(AD-A148811; FAA-AP-84-18; FR-4) Avail: NTIS HC A18/MF A01 CSCL 05H

Sector Suite Man/Machine Functional Capabilities and Performance Requirements documents both the Sector Suite (SS) Man/Machine Interface (MMI) Functional Capabilities and the SS Workstation Functional Capabilities. Requirement specifications are defined for SS MMI application processes, user interface language, display management, resource management, error detection/recovery, data base update/retrieval and SS workstation hardware. The controller tasks defined in CDRL A002--Operations Concept for the AAS MMI are further decomposed into task elements which address data inputs and outputs, and task criticality and frequency. These task element statements are then used to derive SS functional requirements. This analysis provides the basis for a conceptual model of interaction, derives the functional capabilities and performance requirements for essential SS hardware and software functions, drives MMI processing capacity and response time requirements, and defines the requirements for MMI data bases and data base management. GRA

N85-19648# Naval Postgraduate School, Monterey, Calif. Dept. of Computer Science.

MAN-MACHINE INTERACTION: OPERATOR M.S. Thesis

S. K. HARDING Jun. 1984 54 p

(AD-A149075) Avail: NTIS HC A04/MF A01 CSCL 05H

More people than ever before are using computers. Some use only the home computer while others use large mainframes or both. All computers have an interface with which the person must interact to operate the system correctly. This interface must be designed so that the operator can use the system without wasting time and money. This thesis describes some of the issues which should be considered when designing a man-machine interface, and defines some types of operators and their environments. The

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

issues and their resolution are illustrated by a case study which describes the man-machine interface of an actual United States Navy system in use today.

GRA

N85-19649# Human Engineering Labs., Aberdeen Proving Ground, Md.

GUIDE TO HUMAN FACTORS INFORMATION SOURCES Final Report

T. J. WANG Nov. 1984 42 p Sponsored by Army (AD-A149102) Avail: NTIS HC A03/MF A01 CSCL 05E

This guide shows how to search for literature relating to human factors. Manual and machine procedures are discussed in detail. Attention is directed to the development and location of sources of human factors expository material and human factors quantitative data.

GRA

N85-19650# Auburn Univ., Ala.

CREWSTATION ASSESSMENT OF REACH AS APPLIED TO THE OH-58A HELICOPTER M.S. Thesis

M. G. GENETTI 13 Dec. 1984 136 p (AD-A149413) Avail: NTIS HC A07/MF A01 CSCL 01C

A computer evaluation program, Crewstation Assessment of Reach (CARII), was utilized to determine the effectiveness of an evaluation designed for a single person workstation on a two person workstation. The workstation chosen for evaluation was the U.S. Army Helicopter OH-58A. To compensate for the multiple person workstation, the cockpit was defined from three points of view as follows: the pilot while flying, the copilot while flying and an observer in the copilot's station. Through an internal mechanism in the CAR program, a sample of link-men was generated from the means and standard deviations of twelve anthropometric measurements from the data of the 1970 survey of U.S. Army aviators. These link-men were then evaluated for their accommodation to the 24 controls defined in the workstation. Through the example of the relocation of one control, it was demonstrated that an evaluation tool such as CAR should be utilized in the design process. The problem of this study was to determine the effectiveness of the design of a two-person (shared) workstation by using a computerized evaluation method designed to evaluate the percent population accommodated by a single person workstation. GRA

N85-19651# Department of the Navy, Washington, D. C.

SERVO OPERATED ANTI-G SUIT PRESSURIZATION SYSTEM Patent Application

R. J. CROSBIE and P. R. EDWARDS, inventors (to Navy) 22 May 1984 17 p (AD-D011468; US-PATENT-APPL-SN-613497) Avail: NTIS HC A02/MF A01 CSCL 06Q

A servo operated system for controlling pressurization of an aircraft pilot's anti-G suit during high energy maneuvers has a servo operated control valve and a feedback loop controller for minimizing pressure lag in the suit. The controller has dual modes of operation: one for normal flight conditions and one for combat flight conditions. The normal flight mode provides nominal G-protection while the combat mode provides faster response by prepressurizing the anti-G suit to a bias level and lowering the G-force threshold. While in the combat mode, the crewman may select an adjustable pulsating signal to be superimposed on the prepressurization level to obtain additional comfort. Alternatively, he may select a superimposed pulsating signal which is synchronized with his own heartbeat to reinforce the pumping action of the heart.

GRA

N85-19652# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.

HEAT STRESS AND PERSONAL PROTECTIVE EQUIPMENT

B. W. HUNTSMAN Aug. 1984 28 p refs Presented at the DOE and DOE Contractors' Occupational Safety and Health Conf., San Diego, Calif., 11 Sep. 1984 (Contract DE-AC07-76ID-01570) (DE85-003552; EGG-M-16684; CONF-840963-5) Avail: NTIS HC A03/MF A01

The use of personal protective equipment (PPE) in the radiological environment often restricts the body's natural ability to dissipate heat. The basic physiology of heat stress and strain, the use of PPE in accentuating heat stress, and a proposed heat stress program are discussed.

DOE

N85-19653# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).

HUMAN FACTORS CONSIDERATIONS IN HIGH PERFORMANCE AIRCRAFT

Loughton, England Nov. 1984 197 p refs In ENGLISH and FRENCH Symp. held in Williamsburg, Va., 30 Apr. - 2 May 1984 (AGARD-CP-371; ISBN-92-835-0368-6) Avail: NTIS HC A09/MF A01

The physical and mental demands placed on the crews of combat aircraft are severe now and are projected to increase in severity in the next five to fifteen years. Human factors needs, promises and practices to design future aircraft systems to ameliorate the physical stressors and mental workload of the crew are addressed. Future mission requirements, emerging technologies, and findings from research on physiological and cognitive processes and methodology are discussed.

N85-19654# Smiths Industries Ltd., Bishops Cleeve (England).

AIRCREW AND AVIONICS: FRIENDS OR FOES?

R. A. CHORLEY In AGARD Human Factors Considerations in High Performance Aircraft 9 p Nov. 1984 refs Avail: NTIS HC A09/MF A01

The Proliferation of display devices has led to a situation where the complexities of the visual task of acquiring essential information from large numbers of displays, and of providing inputs to the system through large numbers of controllers, are only marginally acceptable. Means are now becoming available to ease this situation. Efforts to design aircrew-friendly avionics systems in an attempt to reduce pilot workload are discussed. Multifunction displays and controllers and facilities, such as direct voice input and speech output are all potentially capable of making avionics systems more efficient.

B.W.

N85-19655# Army Research Inst. Field Unit, Fort Benning, Ga.

MILITARY PILOT ERGONOMICS

I. C. STATLER In AGARD Human Factors Considerations in High Performance Aircraft 13 p Nov. 1984 refs Avail: NTIS HC A09/MF A01

The problem facing virtually all modern military command and control systems is processing and selection among increasingly large amounts of information. Poor system design or excessive mission demands result in high operator workload. A crew workload problem exists in today's tactical military aircraft that can contribute to mission failure or loss of pilot and aircraft. Examples of current designs in which it appears that design engineers have not understood or have ignored fundamental requirements of human sensory and cognitive characteristics and limitations are discussed. Background information to the current problem of the man-machine interface in the tactical military aircraft is provided and current approaches to achieving increased mission performance are discussed.

B.W.

N85-19656# Department of the Air Force, Wright-Patterson AFB, Ohio. F-16 System Program Office.

IMPLICATIONS OF GUIDANCE AND CONTROL TECHNOLOGY ON HUMAN FACTORS CONSIDERATIONS

R. C. ETTINGER *In* AGARD Human Factors Considerations in High Performance Aircraft 13 p Nov. 1984 refs
Avail: NTIS HC A09/MF A01

Emerging technologies in guidance and control which are candidates for future aircraft are discussed. An advanced development program which successfully demonstrated Integrated Fire/Flight Control (IFFC) technology to automatically deliver air-to-air and air-to-surface weapons while maneuvering is described. The advanced cockpit design of the new F-16 C/D aircraft is also described. Brief descriptions of normal acceleration of G induced loss of consciousness, anti-G hardware and pilot G tolerance in the F-16 are also covered. Lastly, the angle of attack and load factor limiting features of the F-16 and how they affect the maneuvering of this relaxed static stability, fly-by-wire, high performance aircraft are described in detail. B.W.

N85-19657# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Human Engineering Dept.

OBSERVATIONS OF PHYSIOLOGICAL AND PSYCHOLOGICAL EFFECTS OF TERRAIN FOLLOWING FLIGHT BASED ON IN-FLIGHT TEST EXPERIENCE

F. KOEHL and D. SEECK (Messerschmitt-Boelkow-Blohm G.m.b.H., Manching, West Germany) *In* AGARD Human Factors Considerations in High Performance Aircraft 8 p Nov. 1984 refs

Avail: NTIS HC A09/MF A01

A short description of the PANAVIA 200 TORNADO TF-System, Displays and Controls is given. The physiological and psychological effects including monitoring and workload aspects during the current TORNADO TF test flying described are a result of interviewing aircrews with a wide variety of individual operational experience. Crew interviews revealed this task to be a high load on the aircrew. Load is a combination of physical and psychic parts, depending on environmental factors and flight conditions. Crew system confidence is acquired through step by step progression to lowest height and from visual meteorological conditions (VMC) to instrument meteorological conditions (IMC)-Terrain Following and will be the base for later services operational pretraining. No pathogenic influences have been observed up to now. B.W.

N85-19661# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Unternehmensgruppe Hubschrauber und Flugzeuge.

IMPACT OF FUTURE AIRCOMBAT CHARACTERISTICS ON PILOT PERFORMANCE AND COCKPIT DESIGN

K. D. RICHTER *In* AGARD Human Factors Considerations in High Performance Aircraft 15 p Nov. 1984 refs
Avail: NTIS HC A09/MF A01

Future medium - and short-range weapons are expected to change aircombat characteristics significantly. Medium-range (MR) weapon technology and performance will force a supersonic maneuvering type aircombat with sustained energy as well as highly dynamic character in terms of climb/descent rates and spatial position changes. All-respect capabilities of new short-range (SR) weapons will establish their employment from head-on, at least frontal hemisphere positions. The SR-aircombat is characterized by instantaneous maneuvering and is drifting to lower speeds and lower loadfactor levels. A high acceleration/reclined seat cockpit seems not necessary, if fighter design requirements are observed. The MR head-down aircombat is expected to influence pilot performance to a large degree and pose problems concerning spatial disorientation; manual versus automatic maneuvering, degree of automation; and aircraft performance monitoring and mental processing of tactical situation information. Solution requirements are postulated to divide human and system tasks. System automation and integration is discussed to reduce pilot workload and create a time margin for qualified decision-making.

A tactical Information & Command System is discussed and a tactical display layout proposed. Author

N85-19662# Centre d'Etudes et de Recherches de Medecine Aerospatiale, Paris (France).

GRASP OF INFORMATION BY THE PILOT IN FUTURE COMBAT AIRCRAFT [PRISE D'INFORMATION PAR LE PILOTE DANS LES AVIONS DE COMBAT FUTURE]

G. SANTUCCI, C. VALOT, R. AMALBERTI, and J. P. MENU *In* AGARD Human Factors Considerations in High Performance Aircraft 7 p Nov. 1984 refs In FRENCH

Avail: NTIS HC A09/MF A01

Future combat aircraft will be complex systems. The management of such a system imposes a much more important workload which should be carried out under intense psychological constraints. There is risk of surpassing the pilot's capacities. To alleviate this, a computer would be added to the pilot's equipment. The division of tasks between these two partners, and the dialog between them, poses problems that must be defined before their solution can be found. The first of these problems must be psychological and physiological simultaneously, and of an intricate type. This approach is developed. Transl. by A.R.H.

N85-19663# Defence Centre for Leadership, Copenhagen (Denmark). Aviation Psychology Branch.

CONCEPTUAL MODEL OF CRITICAL REQUIREMENTS FOR EFFECTIVE PILOT PERFORMANCE IN HIGH PERFORMANCE AIRCRAFT

J. TERMOHLEN *In* AGARD Human Factors Considerations in High Performance Aircraft 8 p Nov. 1984 refs

Avail: NTIS HC A09/MF A01

The conceptual model of critical job requirements of the operational Air Force pilot was updated through an interview study. Participants were pilots of varying flying experience and ranking from colonel to lieutenant. In addition, crew members and air traffic controllers were interviewed. The critical incident technique was used. Participants were asked to relate actual incidents demonstrating effective or ineffective pilot behavior. A total of 153 persons were interviewed; they contributed 444 incidents. Data analysis resulted in the formulation of the following action or trait categories and subcategories: (1) action power and competence (capacity, alertness, independence and will power, decisiveness, coolness); (2) knowing one's limitations and attempting not to exceed them; (3) dependability (admitting mistakes, responsibility, honesty); (4) leadership; (5) self-discipline; (6) social function and team work. The results are to be utilized in policy making by various command and management levels and training of flight instructors, students, and officer candidates. R.S.F.

N85-19665# Royal Aircraft Establishment, Farnborough (England). Flight Systems Dept.

CHANGING SYSTEM AND DISPLAY CONCEPTS AND THEIR IMPACT ON AIRCREW PERFORMANCE

V. P. SCHMIT *In* AGARD Human Factors Considerations in High Performance Aircraft 11 p Nov. 1984 refs

Avail: NTIS HC A09/MF A01

Future aircraft equipment fits and flight profiles are threatening to overload the operator's ability to accept and process the information presented to him, as direct results of an increase in information volume and a reduction in time available. It is assumed that, for the foreseeable future, the primary modality for information display in the cockpit should remain visual, while control inputs to the system will be mutable in modality. A number of topics relating to visually displayed information are considered: (1) visual search and system location cueing; (2) design of spatial location cueing symbology; (3) selective attention and display coding conventions; (4) design procedures for new tactical symbology; (5) information integration in flight information displays; and (6) the costs of attention switching in the flying task. Some new tactical information display concepts are discussed, and areas of research necessary to support future aircraft displays and systems are highlighted.

R.S.F.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

N85-19666# Royal Air Force Inst. of Aviation Medicine, Farnborough (England).

THE PERCEPTION OF AIRCRAFT SPATIAL ORIENTATION

R. M. TAYLOR *In* AGARD Human Factors Considerations in High Performance Aircraft 14 p Nov. 1984 refs

Avail: NTIS HC A09/MF A01

Aircraft head-up display (HUD) standardization should be guided by empirical evidence from studies of operator performance. The effects of HUD pitch scale design variables on pitch and roll recovery tasks were evaluated in four experiments. Design variables are identified that have significant effects on decision making performance. Recommendations are made for HUD pitch scale standardization. The findings are discussed in terms of cognitive processes involved in the perception of complex multidimensional visual stimuli.

R.S.F.

N85-19667# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.

THE COCKPIT OF THE YEAR 2000: HOW BIG A STEP?

J. M. REISING and T. J. EMERSON *In* AGARD Human Factors Considerations in High Performance Aircraft 4 p Nov. 1984 refs

Avail: NTIS HC A09/MF A01

The cockpit of the year 2000 is envisioned to be dramatically different from those of current fighter aircraft. The upcoming hardware and software available in the mid 1990s are discussed together with the impact on the pilot of having them available for use. Among the advanced technologies considered are electro-optic displays, voice control, touch sensitive overlays, programmable switches, helmet mounted displays, and artificial intelligence software.

R.S.F.

N85-19668*# National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

INFLUENCE OF A PERSPECTIVE COCKPIT TRAFFIC DISPLAY FORMAT ON PILOT AVOIDANCE MANEUVERS

S. R. ELLIS, M. W. MCGREEVY, and R. J. HITCHCOCK (San Jose State Univ.) *In* AGARD Human Factors Considerations in High Performance Aircraft 9 p Nov. 1984 refs

Avail: NTIS HC A09/MF A01 CSCL 05H

Perspective projections of cockpit displays of traffic information (CDTI) on CRTs to present vertical separation information to airline pilots were examined. The perspective projection was compared with plan view projections of the same air traffic situations. Comparison of the pilots' avoidance maneuvers made when using the perspective display with those made while using more the conventional plan view display showed that pilots maneuvered somewhat earlier with perspective displays. With the perspective display, they maneuvered more frequently in the vertical dimension. The bias to maneuver horizontally probably reflected the poorer presentation of vertical separation on previously used plan view traffic displays. The avoidance decisions made by pilots using both perspective and plan view displays shows fewer unsuccessful maneuvers and fewer maneuvers producing spacing violations with the perspective format.

E.A.K.

N85-19669# Illinois Univ., Urbana-Champaign. Inst. of Aviation.

THE MULTIPLE RESOURCES MODEL OF HUMAN PERFORMANCE: IMPLICATIONS FOR DISPLAY DESIGN

C. D. WICKENS *In* AGARD Human Factors Considerations in High Performance Aircraft 6 p Nov. 1984

Avail: NTIS HC A09/MF A01

Three cognitive principles of display design proposed within the framework of the multiple resources model of human performance are described. These principles are: (1) stimulus central processing compatibility describing the optimum association of display format, to the working memory code used in performance of a task; (2) resource competition, describing how the optimum configuration for displaying two or more sources of task information is to employ separate resources; and (3) task integration, a principle that constrains the application of the resource competition when separate stimulus elements must be integrated into a single mental

model for the task. Five experiments are described that investigate these principles in isolation and in different combinations in aviation related tasks. The data generally support all three principles, and indicate that compatibility is a dominant concept when placed in opposition with resource competition.

E.A.K.

N85-19670*# National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

PILOT WORKLOAD, PERFORMANCE AND AIRCRAFT CONTROL AUTOMATION

S. G. HART and T. B. SHERIDAN (MIT, Cambridge, Mass.) *In* AGARD Human Factors Considerations in High Performance Aircraft 12 p Nov. 1984 refs

Avail: NTIS HC A09/MF A01 CSCL 05H

Conceptual and practical issues associated with the design, operation, and performance of advanced systems and the impact of such systems on the human operators are reviewed. The development of highly automated systems is driven by the availability of new technology and the requirement that operators safely and economically perform more and more activities in increasingly difficult and hostile environments. It is noted that the operators workload may become a major area of concern in future design considerations. Little research was done to determine how automation and workload relate to each other, although it is assumed that the abstract, supervisory, or management roles that are performed by operators of highly automated systems will impose increased mental workload. The relationship between performance and workload is discussed in relation to highly complex and automated environments.

E.A.K.

N85-19671# Naval Air Development Center, Warminster, Pa.

THE F-18: A NEW ERA FOR HUMAN FACTORS

S. C. MERRIMAN and J. P. MOORE (McDonnell Douglas Corp., St. Louis) *In* AGARD Human Factors Considerations in High Performance Aircraft 5 p Nov. 1984

Avail: NTIS HC A09/MF A01

The crew station of the Navy/Marine Corps' newest high performance tactical jet aircraft - the F/A-18 HORNET and the human factors effort involved in its development and testing are described. The F/A-18 represents the first of a new generation of military aircraft. Its development posed a host of novel man machine interface, crew station design and human factors engineering problems in need of creative solutions. Compared to other tactical jet aircraft currently serving the military, the F/A-18 is, by design, the most mission flexible and growth accommodating aircraft in the inventory. To develop the HORNET major changes in the human factors engineering approach were required. Involved are: thorough mission analyses, technology risk assessment and a step-by-step process of proof or concept in realistic mission simulators.

E.A.K.

N85-19672# National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

AIRCREW-AIRCRAFT INTEGRATION ISSUES IN FUTURE US ARMY HELICOPTERS

E. J. HARTZELL, E. W. AIKEN, and J. W. VOORHEES *In* AGARD Human Factors Considerations in High Performance Aircraft 16 p Nov. 1984 refs

Avail: NTIS HC A09/MF A01 CSCL 05H

Some human factors research issues, the resolution of which will be vital to the successful operation of future military helicopters are reviewed. Understanding and reducing the helicopter pilot's workload is examined by a diverse program directed at answering some of the more fundamental questions relating to the transfer displays and interactions between pilot and automated systems. The results of three experimental studies which address the issues of display control compatibility, characteristics of integrated controllers, and voice systems are presented.

E.A.K.

PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

A85-23868* Osaka Univ. (Japan).

ABIOTIC SYNTHESIS OF PURINES AND OTHER HETEROCYCLIC COMPOUNDS BY THE ACTION OF ELECTRICAL DISCHARGES

S. YUASA (Osaka, University, Osaka, Japan; Houston, University, Houston, TX), D. FLORY (Flory Consultants, Environmental, Inc., Pearland; Houston, University, Houston, TX), B. BASILE, and J. ORO (Houston, University, Houston, TX) *Journal of Molecular Evolution* (ISSN 0022-2844), vol. 21, no. 1, 1984, p. 76-80. refs (Contract NGR-44-005-002)

The synthesis of purines and pyrimidines using Oparin-Urey-type primitive earth atmospheres has been demonstrated by reacting methane, ethane, and ammonia in electrical discharges. Adenine, guanine, 4-aminoimidazole-5-carboxamide (AICA), and isocytosine have been identified by UV spectrometry and paper chromatography as the products of the reaction. The total yields of the identified heterocyclic compounds are 0.0023 percent. It is concluded that adenine synthesis occurs at a much lower concentration of hydrogen cyanide than has been shown by earlier studies. Pathways for the synthesis of purines from hydrogen cyanide are discussed, and a comparison of the heterocyclic compounds that have been identified in meteorites and in prebiotic reactions is presented.

Author

A85-23869* Stanford Univ., Calif.

BETA-DECAY, BREMSSTRAHLEN, AND THE ORIGIN OF MOLECULAR CHIRALITY

W. A. BONNER and L. YI (Stanford University, Stanford, CA) *Journal of Molecular Evolution* (ISSN 0022-2844), vol. 21, no. 1, 1984, p. 84-89. refs (Contract NGL-05-020-582)

A brief review is presented of the Vester-Ulbricht beta-decay Bremsstrahlen hypothesis for the origin of optical activity, and of subsequent experiments designed to test it. Certain experiments along these lines, begun in 1974 and involving the irradiation of racemic and optically active amino acids in a 61.7 KCl Sr-90-Y-90 Bremsstrahlen source, have now been completed and are described. After 10.89 years of irradiation with a total Bremsstrahlen dose of 2.5×10 to the 9th rads, crystalline DL-leucine, norleucine, and norvaline suffered 47.2, 33.6, and 27.4 percent radiolysis, respectively, but showed no evidence whatsoever of asymmetric degradation. Dand L-Leucine underwent about 48 percent radiolysis and showed 2.4-2.9 percent radioracemization. Other samples in solution were too severely degraded to analyze. Probable intrinsic reasons for the failure of the Vester-Ulbricht mechanism to afford asymmetric radiolysis in the present and related experiments involving beta-decay Bremsstrahlen are enumerated.

Author

A85-24440* Wake Forest Univ., Winston-Salem, N.C.

NEW ESTIMATES OF ASYMMETRIC DECOMPOSITION OF RACEMIC MIXTURES BY NATURAL BETA-RADIATION SOURCES

R. A. HEGSTROM (Wake Forest University, Winston-Salem, NC), A. RICH, and J. VAN HOUSE (Michigan, University, Ann Arbor, MI) *Nature* (ISSN 0028-0836), vol. 313, Jan. 31, 1985, p. 391, 392. NASA-NSF-supported research. refs

Some recent calculations that appeared to invalidate the Vester-Ulbricht hypothesis, which suggests that the chirality of biological molecules originates from the beta-radiolysis of prebiotic racemic mixtures, are reexamined. These calculations apparently showed that the radiolysis-induced chiral polarization can never exceed the chiral polarization produced by statistical fluctuations. It is here shown that several overly restrictive conditions were imposed on these calculations which, when relaxed, allow the radiolysis-induced polarization to exceed that produced by statistical

fluctuations, in accordance with the Vester-Ulbricht hypothesis.

C.D.

A85-25568

THE EFFECT OF SILICATES ON THE THERMAL STABILITY OF AMINO ACIDS [VLIJANIE SILIKATOV NA TERMOSTABIL'NOST' AMINOKISLOT]

G. A. LAVRENTEV, T. F. STRIGUNKOVA, and I. A. EGOROV (Akademii Nauk SSSR, Institut Biokhimii, Moscow, USSR) *Geokhimiia* (ISSN 0016-7525), Dec. 1984, p. 1911-1917. In Russian. refs

The effect of mineral matrices on the kinetics of the thermal decomposition of L-lysine in arid conditions was investigated experimentally. In the experiment, L-lysine was adsorbed onto samples of two different argillaceous minerals (montmorillonite and kaolite) and mixed in a centrifuge. The mixtures were heated to temperatures between 483 and 553 K in order to study thermochemical transformations of the adsorbed amino acid. Gas-chromatographic analysis of the minerals showed that a portion of the L-lysine dissolved faster than in a crystal state, and that the remaining portion of the L-lysine was stabilized. The experimental results are discussed within the framework of recent theoretical models of the evolution of amino acids in the Precambrian epoch.

I.H.

A85-25667

PRECAMBRIAN FOSSILS AND THE ORIGINS OF BIOLOGIC ORGANIZATION [LES FOSSILES PRECAMBRIENS ET LES ORIGINES DE L'ORGANISATION BILOGIQUE]

E. BOUREAU Academie des Sciences (Paris), *Comptes Rendus, Serie Generale, La Vie des Sciences* (ISSN 0762-0969), vol. 1, no. 5, Oct.-Dec. 1984, p. 431-457. refs

Paleobotanical data are reviewed to trace the evolution of the eukaryotic cell over geologic time spans. It is assumed that the environment constantly acts on organisms, which must react. The reaction is thought to take place in increasingly larger symbiotic groups. No sudden, universal grouping of prebiotic molecules into a unique coacervate could account for the diversity of existing basic cells. Terrestrial life may have arisen some 4.5 billion yr ago under conditions that are not well delineated. The formation of large amounts of free oxygen in the Precambrian epoch was the catalyst for massive species evolution 2.5 billion years ago. Experimentation with electrical discharges into gases thought similar to those present in Precambrian times has yielded numerous prebiotic molecular species. Pre-living forms could have appeared as the molecules joined into coccoides collected inside of a membrane, a process which has been demonstrated to continue under high temperature and pressure. The fossil record for the increasingly complex cellular forms is traced up to the first known eukaryote, noting that different paths were followed simultaneously in different regions of the earth, all involving formation of a wall and a nucleus within.

M.S.K.

A85-25674

LIFE ON THE TERRESTRIAL PLANETS? [LA VIE DANS LES PLANETES TELLURIQUES?]

J. BLAMONT (Paris VI, Universite; CNRS, Service d'Aeronomie, Paris, France) *L'Astronomie* (ISSN 0004-6302), vol. 99, Feb. 1985, p. 55-65. In French.

The orbital, atmospheric, and thermodynamic properties of earth, Mars, and Venus are compared in tables, and the possibility of biological activity on Mars is evaluated on the basis of data from Viking 1 and 2. The Viking landers are illustrated with drawings and photographs; the results of organic and inorganic analyses of Martian soils are summarized; the planet surface is characterized as the most sterile in the solar system due to the presence of peroxides, the low temperatures, the absence of O₂ and liquid H₂O, and the strong UV flux; and the evolution of the Martian surface and atmosphere is discussed.

T.K.

55 PLANETARY BIOLOGY

A85-25839

AMMONIUM CONTENTS OF BIOTITES FROM PRECAMBRIAN ROCKS IN FINLAND - THE SIGNIFICANCE OF NH4(+) AS A POSSIBLE CHEMICAL FOSSIL

Y. ITIHARA (Osaka City University, Osaka, Japan) and K. SUWA (Nagoya University, Nagoya, Japan) *Geochimica et Cosmochimica Acta* (ISSN 0016-7037), vol. 49, Jan. 1985, p. 145-151. refs

A modified version (using HF + H₂SO₄) of the analytical technique of Itihara and Honma (1979) is used to determine the NH₄(+) content of Precambrian biotites separated from rock samples from Finland. The results are presented in tables and graphs and analyzed, using NH₄(+) as a potential indicator of biological activity. Significantly higher NH₄(+) is found in Svecokarelian metasediments of age 1.9-2.4 Gyr than in Svecokarelian plutonic rocks (1.8-1.9 Gyr), Postsvecokarelian rapakivi granites (1.65-1.7 Gyr), or Presvecokarelian schists (2.6-2.8 Gyr). The finding of biological activity in the metasediments is in agreement with the discoveries of stromatolite structures in the Jatulian dolomites of the Karelides and of carbonaceous sacs in the Svecofennian greywacke-slates (Simonen, 1980) from the same period.

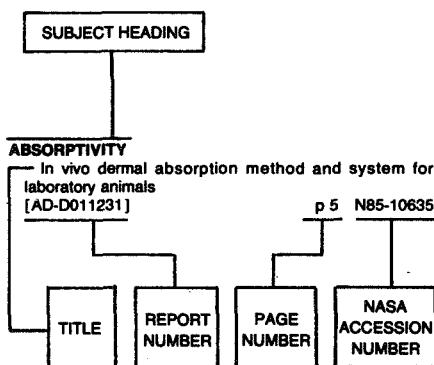
T.K.

SUBJECT INDEX

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Supplement 272)

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Typical Subject Index Listing



The subject heading is a key to the subject content of the document. The title is used to provide a description of the subject matter. When the title is insufficiently descriptive of the document content, the title extension is added, separated from the title by three hyphens. The (NASA or AIAA) accession number and the page number are included in each entry to assist the user in locating the abstract in the abstract section. If applicable, a report number is also included as an aid in identifying the document. Under any one subject heading, the accession numbers are arranged in sequence with the AIAA accession numbers appearing first.

A

ABIOGENESIS

Abiotic synthesis of purines and other heterocyclic compounds by the action of electrical discharges

p 211 A85-23868

ACCELERATION STRESSES (PHYSIOLOGY)

Influence of G-suit abdominal bladder inflation on gas exchange during +Gz stress

p 171 A85-25706

Analysis of the transient response of temporal artery blood flow data relative to various anti-G suit pressure schedules

p 190 N85-19660

ACCELERATION TOLERANCE

Tolerance, fatigue, physiological and performance effects of sustained and oscillating lateral accelerations

p 190 N85-19659

ACCIDENT INVESTIGATION

Factors influencing the incidence and severity of 'ejection associated' neck injuries sustained by U.S. Navy ejectionees 1 January 1969 through 31 December 1979 - A preliminary report

p 177 A85-22776

ACID BASE EQUILIBRIUM

Carbohydrate metabolism and acid-base equilibrium in relation to nutrition in persons performing physical and mental work in the Estonian SSR

p 181 A85-23274

Ventilation and acid-base balance in awake dogs exposed to heat and CO₂

p 172 A85-25709

ACOUSTIC EXCITATION

Effect of low-frequency acoustic oscillations and certain erythrocyte membrane components in vitro

p 165 A85-23218

ACRYLIC RESINS

Effect of methylmethacrylate and acrylamide on the microsomal oxidation system in the rat liver

p 168 A85-23294

ACTIVITY (BIOLOGY)

Effect of decimeter-range waves on the aggregation activity of thrombocytes, given different localizations of effects in victims of cerebral insult

p 178 A85-23204

- Activity, act, and the psychic as a process p 191 A85-23226
- The effect of deficient blood supply in the heart on ATPase systems p 168 A85-23293
- Activation and localization of transport ATPase in cells of pea-seedling roots in hypogravity conditions p 169 A85-23305
- ACUITY**
- Quantitative measurement of human auditory acuity p 187 N85-19614
- ADAPTATION**
- Gravitational adaptation in forest trees p 166 A85-23224
- Redundancy as a principle of the programming activity of the brain p 169 A85-23303
- ADAPTIVE CONTROL**
- Some principles for the construction of an adaptive training system p 192 A85-23279
- ADENOSINE TRIPHOSPHATE**
- The effect of deficient blood supply in the heart on ATPase systems p 168 A85-23293
- Activation and localization of transport ATPase in cells of pea-seedling roots in hypogravity conditions p 169 A85-23305
- ADRENAL GLAND**
- The effect of long-term stress on the hypophyseal-adrenal-gonad systems in rabbits of various ages p 172 A85-26254
- ADRENAL METABOLISM**
- Epinephrine is unessential for stimulation of liver glycogenolysis during exercise p 172 A85-25708
- The function of the adrenal cortex and the ovaries in normal subjects and in patients with iron deficiency anemia from an arid region during adaptation to mountain conditions p 184 A85-26260
- ADRENERGICS**
- The physiological role of adrenergic elements of the hypothalamus in the regulation of hypothalamo-adeno-hypophyseal systems of adaptation p 174 A85-26288
- ADSORPTIVITY**
- Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 2: Adsorption of alcyan blue by external premembranous components p 175 N85-18564
- AEROBIOLOGY**
- Growth of soil bacteria in presence of Martian soil analog, carbon dioxide and hydrogen peroxide p 175 N85-18560
- AEROSPACE MEDICINE**
- Factors influencing the incidence and severity of 'ejection associated' neck injuries sustained by U.S. Navy ejectionees 1 January 1969 through 31 December 1979 - A preliminary report
- USSR report: Life sciences. Biomedical and behavioral sciences
- [JPBS-UBB-85-002] p 174 N85-18559
- USSR report: Life sciences. Biomedical and behavioral sciences
- [JPBS-UBB-85-011] p 177 N85-19616
- Be healthy, pilot p 188 N85-19626
- Aerospace medicine and biology: A continuing bibliography with indexes
- [NASA-SP-7011(269)] p 188 N85-19628
- AEROSPACE SAFETY**
- An overview of medical-biological radiation hazards in earth orbits
- [IAF PAPER 83-256] p 203 A85-23811
- AFFERENT NERVOUS SYSTEMS**
- General features of sensory processes under the effects of extreme stimuli p 171 A85-25644
- Effect of cutaneous denervation of face and trunk on thermoregulatory responses to cold in rats p 171 A85-25701
- AFTERIMAGES**
- Reduction of display artifacts by random sampling p 204 A85-24291
- AGE FACTOR**
- The morphofunctional characteristics of intraorgan arterial vessels in the kidney in the normal state and in certain cardiovascular diseases p 180 A85-23239
- The age-related aspects of vestibular function in patients with chronic purulent otitis media according to cupulometry data p 181 A85-23264
- The effect of long-term stress on the hypophyseal-adrenal-gonad systems in rabbits of various ages p 172 A85-26254
- AGGLUTINATION**
- Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths: Report 1: Expression of ABO and Rhesus system antigen p 175 N85-18564
- Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 2: Adsorption of alcyan blue by external premembranous components p 175 N85-18565
- AIR NAVIGATION**
- A method for studying work activities --- of air navigator p 191 A85-23231
- AIR TRAFFIC CONTROL**
- Oversight in Eurocontrol-Central, Maastricht UAC p 205 A85-25515
- AIRCRAFT ACCIDENTS**
- U.S. Navy aviation mishap aircrew anthropometry - 1 January 1969 through 31 December 1979 p 201 A85-22775
- AIRCRAFT CONTROL**
- Effect of random perturbations on the controllability domain in ergatic dynamic systems p 203 A85-24030
- Use of airplanes for loft training p 197 N85-18019
- Pilot workload, performance and aircraft control automation p 210 N85-19670
- AIRCRAFT DESIGN**
- U.S. Navy aviation mishap aircrew anthropometry - 1 January 1969 through 31 December 1979 p 201 A85-22775
- AIRCRAFT GUIDANCE**
- Implications of guidance and control technology on human factors considerations p 209 N85-19656
- AIRCRAFT INSTRUMENTS**
- Changing system and display concepts and their impact on aircraft performance p 209 N85-19665
- AIRCRAFT NOISE**
- Aircraft noise effects: An interdisciplinary study of the effects of aircraft noise on man. Part 1: Basic report [NASA-TM-75819] p 188 N85-19629
- Aircraft noise effects: An interdisciplinary study of the effect of aircraft noise on man. Part 2: Appendix [NASA-TM-75818] p 188 N85-19630
- Aircraft noise effects: An inter-disciplinary study of the effect of aircraft noise on man. Part 3: Supplementary analyses of the social-scientific portion of the study on aircraft noise conducted by the DFG [NASA-TM-75802] p 188 N85-19631
- AIRCRAFT PILOTS**
- Simulation of pilot activity on the basis of on-board-recorder data p 203 A85-24034
- Optimization of pilot-retraining programs with allowance for the individual qualities of the pilots p 204 A85-24038
- Management training for cockpit crews at Piedmont flight p 197 N85-18013
- Video concepts in CRM training p 197 N85-18015
- Be healthy, pilot p 188 N85-19626
- Grasp of information by the pilot in future combat aircraft p 209 N85-19662
- AIRCRAFT SURVIVABILITY**
- Life Support System Program Office - 1983 corporate report p 201 A85-22761
- AIRLINE OPERATIONS**
- Simulation p 197 N85-18024
- AIRPORTS**
- Aircraft noise effects: An inter-disciplinary study of the effect of aircraft noise on man. Part 3: Supplementary analyses of the social-scientific portion of the study on aircraft noise conducted by the DFG [NASA-TM-75802] p 188 N85-19631
- ALGAE**
- Artificial photosynthesis with algal and reconstituted systems
- [DE85-002557] p 176 N85-19604

S
U
B
J
E
C
T

ALGORITHMS

Algorithm for the computer identification and processing of the psychophysiological parameters of human operators in a tracking process p 202 A85-23162

Some principles for the construction of an adaptive training system p 192 A85-23279

ALKALOSIS

Respiratory chain of alkalophilic bacteria [DE84-012558] p 174 N85-18556

ALKYLATION

Changes in redox processes in rats with anemia due to alkylating preparations in alpine climatic conditions p 172 A85-26253

ALTITUDE ACCLIMATIZATION

Experimental atherosclerosis in middle-altitude conditions p 165 A85-23201

Changes in redox processes in rats with anemia due to alkylating preparations in alpine climatic conditions p 172 A85-26253

The function of the adrenal cortex and the ovaries in normal subjects and in patients with iron deficiency anemia from an arid region during adaptation to mountain conditions p 184 A85-26260

ALTITUDE SICKNESS

Simulator sickness: Sensorimotor disturbances induced in flight simulators [AD-P004334] p 184 N85-17988

ALTITUDE TOLERANCE

Redox processes in the rat myocardium under acute hypoxia p 172 A85-26251

AMINO ACIDS

Free amino acids in the brains of some vertebrates p 169 A85-23308

New estimates of asymmetric decomposition of racemic mixtures by natural beta-radiation sources p 211 A85-24440

The effect of silicates on the thermal stability of amino acids p 211 A85-25568

AMMONIUM COMPOUNDS

Ammonium contents of biotites from Precambrian rocks in Finland - The significance of NH4(+) as a possible chemical fossil p 212 A85-25839

AMPLITUDES

Amplitude characteristics of the electric field of the heart p 181 A85-23262

ANALOGS

Growth of soil bacteria in presence of Martian soil analog, carbon dioxide and hydrogen peroxide p 175 N85-18560

ANATOMY

Significance of ultrasonic echo studies for human anatomy p 180 A85-23240

Anatomical aspects of the use of computer tomography (Review of the non-Soviet literature) p 166 A85-23241

ANEMIAS

Changes in redox processes in rats with anemia due to alkylating preparations in alpine climatic conditions p 172 A85-26253

The function of the adrenal cortex and the ovaries in normal subjects and in patients with iron deficiency anemia from an arid region during adaptation to mountain conditions p 184 A85-26260

ANGLE OF ATTACK

Implications of guidance and control technology on human factors considerations p 209 N85-19656

ANNUAL VARIATIONS

Specific differences and seasonal fluctuations in blood serum enzyme activity in experimental animals p 172 A85-26252

ANTHROPOLOGY

The complex study of man - The place of psychology p 191 A85-23250

ANTHROPOMETRY

U.S. Navy aviation mishap aircrew anthropometry - 1 January 1969 through 31 December 1979 p 201 A85-22775

Crewstation assessment of reach as applied to the OH-58A helicopter [AD-A149413] p 208 N85-19650

ANTICOAGULANTS

Management of microcirculatory disorders in vibration sickness p 186 N85-19611

ANTIGENS

Promising methods for early laboratory diagnosis of infectious diseases p 183 A85-25619

Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 1: Expression of ABO and Rhesus system antigen p 175 N85-18564

Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 2: Adsorption of alcyan blue by external premembranous components p 175 N85-18565

ANTIGRAVITY

Analysis of the transient response of temporal artery blood flow data relative to various anti-G suit pressure schedules p 190 N85-19660

APES

The genetic similarity of man and the anthropoid apes p 166 A85-23225

ARGON

The effect of inert gases on ion transport across the erythrocyte membrane [AD-A148889] p 189 N85-19635

ARID LANDS

Physiological characterization of the work of the operating personnel of a power system in an arid zone p 179 A85-23219

Work physiology of operating personnel at power plants in arid regions p 207 N85-19606

ARMED FORCES (FOREIGN)

Conceptual model of critical requirements for effective pilot performance in high performance aircraft p 209 N85-19663

ARMED FORCES (UNITED STATES)

United States Air Force undergraduate pilot training today and tomorrow [SAE PAPER 841589] p 196 A85-25987

Closed-loop concepts for the Army: Water conservation, recycle, and reuse [AD-A148839] p 207 N85-18581

ARTERIOSCLEROSIS

The structure of the renal artery wall during restricted motor activity p 166 A85-23234

The morphofunctional characteristics of intraorgan arterial vessels in the kidney in the normal state and in certain cardiovascular diseases p 180 A85-23239

Analysis of the transient response of temporal artery blood flow data relative to various anti-G suit pressure schedules p 190 N85-19660

ASTROSCLEOSIS

Experimental atherosclerosis in middle-altitude conditions p 165 A85-23201

The morphofunctional characteristics of intraorgan arterial vessels in the kidney in the normal state and in certain cardiovascular diseases p 180 A85-23239

ASTRONAUTS

Approaches to radiation guidelines for space travel [DE85-001248] p 186 N85-18576

ASYMMETRY

Multiple resources and brain laterality [AD-A148912] p 199 N85-19643

ATMOSPHERIC MOISTURE

Responses of people to heat load in saunas p 178 A85-23203

ATMOSPHERIC TURBULENCE

Effect of random perturbations on the controllability domain in ergotic dynamic systems p 203 A85-24030

ATTACK AIRCRAFT

USAFSAM integration laboratory assessments of the Advanced Chemical Defence Aircrew Respirator (ACDAR) p 200 A85-22756

ATTENTION

The effect of a task on human skin mechanoreceptor response p 192 A85-23284

Selecting one among the many: A simple network implementing shifts in selective visual attention [AD-A148989] p 199 N85-19644

AUDITORY FATIGUE

Comparative assessment of different treatment modalities in miners with vibration- and noise-induced disease p 186 N85-19610

AUDITORY PERCEPTION

Quantum noise and the threshold of hearing p 170 A85-25043

Nonlinear and parametric resonance in human hearing and sight organs p 174 A85-26297

Neurocognitive pattern analysis of an auditory and visual numeric motor control task. Part 1: Development of methods [AD-A148809] p 198 N85-18578

Quantitative measurement of human auditory acuity p 187 N85-19614

AUDITORY TASKS

Communications skills for CRM training p 197 N85-18017

Neurocognitive pattern analysis of an auditory and visual numeric motor control task. Part 1: Development of methods [AD-A148809] p 198 N85-18578

AUTOMATION

A system-level approach to automation research p 202 A85-23197

Role of engineering psychology p 197 N85-18561

Problems of psychological support of automated organization control systems p 198 N85-18571

Dialog system of preparation and presentation of visual information p 198 N85-19622

Pilot workload, performance and aircraft control automation p 210 N85-19670

AUTONOMIC NERVOUS SYSTEM

The integration of motor and vegetative functions during muscular work p 183 A85-25645

AUTOREGRESSIVE PROCESSES

Prospects for the use of models of autoregression-sliding mean type for EEG analysis p 182 A85-23306

AVIONICS

Human Factors Considerations in High Performance Aircraft [AGARD-CP-371] p 208 N85-19653

Aircraft and avionics: Friends or Foes? p 208 N85-19654

AVOIDANCE

The effect of paradoxical sleep deprivation on the learning of the active avoidance reaction p 173 A85-26261

B

BACKGROUND RADIATION

Effect of an elevated level of natural radioactivity on glycogen content in peripheral-blood leukocytes of Microtus oeconomus Pall p 170 A85-24027

BACTERIA

The photosynthetic apparatus of bacteria as a converter of the energy of light into electrical energy p 170 A85-24650

Respiratory chain of alkalophilic bacteria [DE84-012558] p 174 N85-18556

BACTERIOLOGY

Growth of soil bacteria in presence of Martian soil analog, carbon dioxide and hydrogen peroxide p 175 N85-18560

BEHAVIOR

USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-85-007] p 175 N85-18566

USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-85-009] p 177 N85-19625

BETA PARTICLES

Beta-decay, Bremsstrahlen, and the origin of molecular chirality p 211 A85-23869

BIBLIOGRAPHIES

Aerospace medicine and biology: A continuing bibliography with indexes [NASA-SP-701269] p 188 N85-19628

BINOCULAR VISION

Laser optometric assessment of visual display viewability p 200 A85-22590

Panoramic vision and its applications p 192 A85-23277

Vision in the presence of known natural retinal image motion p 193 A85-24384

Smooth pursuit of small-amplitude sinusoidal motion p 193 A85-24385

Interaction between saccade and tracking vergence p 194 A85-24501

BIOACOUSTICS

A mechanism for the effect of noise on the labyrinth p 165 A85-23209

Significance of ultrasonic echo studies for human anatomy p 180 A85-23240

BIOCHEMISTRY

Structural studies of human IgA1 and IgA2 immunoglobulins tagged with two different spin-labels p 181 A85-23251

Changes in the composition of mitochondrial lipids in the presence of dinitrophenol under hypoxic conditions p 168 A85-23291

New estimates of asymmetric decomposition of racemic mixtures by natural beta-radiation sources p 211 A85-24440

The effect of silicates on the thermal stability of amino acids p 211 A85-25568

Muscle contraction and free energy transduction in biological systems p 172 A85-25822

USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-85-002] p 174 N85-18559

Bioelectrochemistry 2: Membrane phenomena [AD-A149132] p 176 N85-19602

BIOCONTROL SYSTEMS

An analysis of the regulation of noradrenaline secretion by autoadreno-receptors and frequency stimulation p 167 A85-23258

Central control of cardiovascular adjustments to exercise p 184 A85-25704

BIODYNAMICS

Functional work load on an operator for various regimes of the movement of closed eyes p 191 A85-23244

Magnetic susceptibility and the magnetic capture of cells p 167 A85-23253

SUBJECT INDEX

- The muscle as a system of parametric excitation p 167 A85-23257
- Investigation of the goal-directed motions of a human in an unsupported state p 204 A85-24037
- The locomotor region of the trucus cerebri and the hypothesis of a locomotor column p 174 A85-26287
- Biomechanical studies of impact acceleration research [AD-A149077] p 176 N85-19601
- BIOELECTRIC POTENTIAL**
- Psychophysiological study of visual fatigue and recovery of the initial level of work capacity p 177 A85-23152
- Slow negative potentials and probabilistic prediction --- for operator performance evaluation p 178 A85-23160
- An optical study of electromechanical coupling in heart fibers p 167 A85-23256
- Configurational generators of neural rhythm p 167 A85-23259
- Temporary endocardial electrocardiostimulation during disturbances of heart rhythm and conduction p 181 A85-23260
- Amplitude characteristics of the electric field of the heart p 181 A85-23262
- Psychological aspects of the phenomenon of spatial synchronization of potentials p 192 A85-23280
- The dynamics of an extremely slow omega-potential and EEG spatial synchronization in the presence of muscle fatigue p 183 A85-25646
- Electrical sources in human somatosensory cortex Identification by combined magnetic and potential recordings p 184 A85-25824
- BIOELECTRICITY**
- Electrical sources in human somatosensory cortex Identification by combined magnetic and potential recordings p 184 A85-25824
- The role of mitochondria in the regulation of Ca(2+) transmembrane current in myocardial cells p 173 A85-26285
- The physical basis for the generation of neuromagnetic fields p 174 A85-26298
- BIOFEEDBACK**
- A method for controlling the state of an operator in conditions of complex activity p 190 A85-23156
- Central control of cardiovascular adjustments to exercise p 184 A85-25704
- BIOINSTRUMENTATION**
- Anatomical aspects of the use of computer tomography (Review of the non-Soviet literature) p 166 A85-23241
- Generation-V dual-Purkinje-image eyetracker p 204 A85-25089
- BIOLOGICAL EFFECTS**
- Radiation doses and biological effects of cosmic rays p 165 A85-22853
- Effect of low-frequency acoustic oscillations and certain erythrocyte membrane components in vitro p 165 A85-23218
- Gravitational adaptation in forest trees p 166 A85-23224
- Magnetic susceptibility and the magnetic capture of cells p 167 A85-23253
- The effect of magnetic fields on somatic cell division in plants p 169 A85-23302
- Genetic effects of microwave exposure on mammalian cells in vitro, volume 2 p 176 N85-19603
- USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-85-008] p 176 N85-19605
- Aerospace medicine and biology: A continuing bibliography with indexes [NASA-SP-7011(269)] p 188 N85-19628
- BIOLOGICAL EVOLUTION**
- The connection between the parameters of sodium and potassium distribution and the contractile properties of muscles p 169 A85-23307
- Evolutionary constraints and the neutral theory --- mutation-caused nucleotide substitutions in DNA p 170 A85-23870
- Precambrian fossils and the origins of biologic organization p 211 A85-25667
- BIOLOGICAL MODELS (MATHEMATICS)**
- Rapid monitoring and prediction of the psychophysiological state of an operator during the simulation of emergency situations p 190 A85-23159
- A simulation of the regional deposition of air ions in human lungs p 181 A85-23255
- The muscle as a system of parametric excitation p 167 A85-23257
- Configurational generators of neural rhythm p 167 A85-23259
- Some perspectives on the study and improvement of the cognitive-creative activity of an individual and a group p 191 A85-23276
- The principles of experimental setup in models of complex human operator activities p 192 A85-23283

- Probabilistic model of the unconscious - The unconscious as manifestation of a semantic universe p 193 A85-23287
- Spatiotemporal energy models for the perception of motion p 194 A85-24391
- Elaborated Reichardt detectors p 204 A85-24392
- Model of human visual-motion sensing p 194 A85-24393
- A mathematical model of visual perception regarding peripheral vision and its application to the Hermann's illusion p 195 A85-25199
- A model of a constant color perception pattern for the case of continuous spectral functions p 184 A85-26296
- Nonlinear and parametric resonance in human hearing and sight organs p 174 A85-26297
- BIOLOGY**
- The complex study of man - The place of psychology p 191 A85-23250
- BIOMAGNETISM**
- Effect of a low-frequency alternating magnetic field on the course of pyrogenic fever p 165 A85-23202
- Magnetic susceptibility and the magnetic capture of cells p 167 A85-23253
- The effect of magnetic fields on somatic cell division in plants p 169 A85-23302
- Electrical sources in human somatosensory cortex Identification by combined magnetic and potential recordings p 184 A85-25824
- The physical basis for the generation of neuromagnetic fields p 174 A85-26298
- BIOMETRICS**
- Generation-V dual-Purkinje-image eyetracker p 204 A85-25089
- BIOPHYSICS**
- Structural studies of human IgA1 and IgA2 immunoglobulins tagged with two different spin-labels p 181 A85-23251
- An optical study of electromechanical coupling in heart fibers p 167 A85-23256
- Configurational generators of neural rhythm p 167 A85-23259
- General features of sensory processes under the effects of extreme stimuli p 171 A85-25644
- Neural dynamics of brightness perception - Features, boundaries, diffusion, and resonance p 195 A85-25789
- Nonlinear and parametric resonance in human hearing and sight organs p 174 A85-26297
- Radiation physics, biophysics, and radiation biology [DE84-014885] p 174 N85-18557
- Bioelectrochemistry 2: Membrane phenomena [AD-A149132] p 176 N85-19602
- BIOTECHNOLOGY**
- USAF Aerospace Biotechnology Research and Development p 200 A85-22755
- BIOTITE**
- Ammonium contents of biotites from Precambrian rocks in Finland - The significance of NH4(+) as a possible chemical fossil p 212 A85-25839
- BLOOD CIRCULATION**
- The state of the sanguiferous bed of the vascular tunic of the eyeball and retrobulbar formations in association with experimental vascular congestion p 166 A85-23237
- Maximal blood-circulation modes p 183 A85-25648
- Blood viscosity responses to acute exercise and aerobic conditioning in women p 185 N85-18573
- Hemodynamics responses to upright tilt at sea level and high altitude p 189 N85-19634
- BLOOD FLOW**
- Analysis of the transient response of temporal artery blood flow data relative to various anti-G suit pressure schedules p 190 N85-19660
- BLOOD PLASMA**
- Severe renal insufficiency due to hyperuricemia and urea nephrolithiasis p 180 A85-23221
- Alcohol dehydrogenase in the blood serum of healthy persons and of patients with chronic alcoholism p 182 A85-23292
- Status of the kallikrein-kinin system in blood from the cardiac ventricles in the development dynamics of spontaneous hypertension in rats p 169 A85-23298
- Specific differences and seasonal fluctuations in blood serum enzyme activity in experimental animals p 172 A85-26252
- BLOOD PRESSURE**
- Mechanism for the increase of arterial pressure in a state of rest and during physical exercise in patients with hypertension p 182 A85-23312
- BLOOD VOLUME**
- Changes in central hemodynamic parameters under the influence of volume loading in a healthy state, and during experimental myocardial infarction p 173 A85-26258

BRIGHTNESS DISCRIMINATION

- BODY COMPOSITION (BIOLOGY)**
- Free amino acids in the brains of some vertebrates p 169 A85-23308
- BODY KINEMATICS**
- Investigation of the goal-directed motions of a human in an unsupported state p 204 A85-24037
- BODY TEMPERATURE**
- Influence of hyperthermia on body temperature and content of catecholamines in white rat hypothalamus p 176 N85-19615
- Heat stress and personal protective equipment [DE85-003552] p 208 N85-19652
- BODY VOLUME (BIOLOGY)**
- An investigation of the isovolumic indices of myocardial contractility in response to directed changes in heart function p 173 A85-26257
- BODY WEIGHT**
- Changes in the size of the long tubular bones and body mass of rats under physical loads graded according to the time of day p 166 A85-23235
- The structural characteristics of the metacarpal bones of athletes practising a variety of sports p 180 A85-23236
- BONE MINERAL CONTENT**
- The effect of an iron deficient diet on the formation of bone tissue p 168 A85-23275
- BONES**
- Changes in the size of the long tubular bones and body mass of rats under physical loads graded according to the time of day p 166 A85-23235
- The structural characteristics of the metacarpal bones of athletes practising a variety of sports p 180 A85-23236
- BOREDOM**
- Study of bodily functional status and quality of controlling action of power unit operators with various intensities of labor p 206 N85-18569
- BRAIN**
- An investigation of the psychological aspects of individual manifestations of sociability in humans p 192 A85-23281
- Free amino acids in the brains of some vertebrates p 169 A85-23308
- Neurochemical mechanisms for the regulation of pain sensitivity p 173 A85-26286
- Neurocognitive pattern analysis of an auditory and visual numeric motor control task. Part 1: Development of methods [AD-A148809] p 198 N85-18578
- Electrosleep therapy advanced at medical institute p 188 N85-19623
- Multiple resources and brain laterality [AD-A148912] p 199 N85-19643
- BRAIN CIRCULATION**
- Scintigraphy and emission computer tomography of the head in the diagnosis of intracranial vascular congestion p 180 A85-23246
- The state of the central and cerebral hemodynamics in normal subjects and in patients with incipient cerebral circulation insufficiency p 180 A85-23247
- The hemodynamics of various stages of nighttime sleep in patients with preliminary symptoms of cerebral hemodynamic deficiency p 180 A85-23248
- Climatological aspect of the epidemiology of acute disturbances of brain circulation (Review) p 180 A85-23249
- An investigation of the cerebral hemodynamics of workers exposed to industrial noise p 181 A85-23265
- BRAIN DAMAGE**
- Application of active oculography and electromyography to analyze the effect of drugs p 178 A85-23165
- The syncopal state associated with moderate craniocerebral trauma p 179 A85-23220
- A complex method for evaluating the color vision of patients with localized cerebral lesions p 180 A85-23230
- The state of the central and cerebral hemodynamics in normal subjects and in patients with incipient cerebral circulation insufficiency p 180 A85-23247
- BRAIN STEM**
- The locomotor region of the trucus cerebri and the hypothesis of a locomotor column p 174 A85-26287
- BREMSSTRAHLUNG**
- Beta-decay, Bremsstrahlen, and the origin of molecular chirality p 211 A85-23869
- BRIGHTNESS**
- Individual differences in chromatic brightness matching [AD-A148882] p 199 N85-19641
- BRIGHTNESS DISCRIMINATION**
- Neural dynamics of brightness perception - Features, boundaries, diffusion, and resonance p 195 A85-25789

C

CALCIUM

The role of mitochondria in the regulation of Ca(2+) transmembrane current in myocardial cells
p 173 A85-26285

CANCER

Radiation physics, biophysics, and radiation biology
[DE84-014885] p 174 N85-18557

CARBOHYDRATE METABOLISM

Carbohydrate metabolism and acid-base equilibrium in relation to nutrition in persons performing physical and mental work in the Estonian SSR p 181 A85-23274

The effect of isatin and its derivatives on certain indices of carbohydrate metabolism p 168 A85-23295

Investigation of the total activity and distribution of multiple forms of a number of lysosomal glycosidases in subfractions of human leukocytes p 182 A85-23296

Activation and localization of transport ATPase in cells of pea-seedling roots in hypogravity conditions p 169 A85-23305

Epinephrine is unessential for stimulation of liver glycogenolysis during exercise p 172 A85-25708

CARBON TETRACHLORIDE

Health assessment document for carbon tetrachloride [PB85-124196] p 190 N85-19638

CARDIAC AURICLES

An optical study of electromechanical coupling in heart fibers p 167 A85-23256

CARDIAC VENTRICLES

The relief characteristics of the internal surface of the cardiac ventricles and Viessen-Thebesian vessels p 180 A85-23238

Status of the kallikrein-kinin system in blood from the cardiac ventricles in the development dynamics of spontaneous hypertension in rats p 169 A85-23298

Chronic exercise and left ventricular structure and function in healthy human subjects p 184 A85-25703

CARDIOLOGY

The relief characteristics of the internal surface of the cardiac ventricles and Viessen-Thebesian vessels p 180 A85-23238

Temporary endocardial electrocardiostimulation during disturbances of heart rhythm and conduction p 181 A85-23260

Amplitude characteristics of the electric field of the heart p 181 A85-23262

CARDIOVASCULAR SYSTEM

Work capacity of heat and electric power plant operations working 12 hour day and night shifts p 206 N85-18567

Morbidity and mortality associated with exposure to Otto Fuel II in the U.S. Navy 1966-1979 p 185 N85-18574

Variability of cardiac rhythm during information loading p 187 N85-19619

Medically disqualified airline pilots [AD-A149454] p 189 N85-19637

CATALASE

Change in the response of the heart to posthypoxic reoxygenation after injection of superoxide dismutase and its inhibitor p 171 A85-25617

CATECHOLAMINE

Influence of hyperthermia on body temperature and content of catecholamines in white rat hypothalamus p 176 N85-19615

CAUSES

Factors influencing the incidence and severity of 'ejection associated' neck injuries sustained by U.S. Navy ejectioneers 1 January 1969 through 31 December 1979 - A preliminary report p 177 A85-22776

CELLS (BIOLOGY)

Radiation physics, biophysics, and radiation biology [DE84-014885] p 174 N85-18557

Genetic effects of microwave exposure on mammalian cells in vitro. Volume 2, Appendix A: Cytogenetics and growth kinetics data, 850 MHz [AD-A148866] p 175 N85-19599

Genetic effects of microwave exposure on mammalian cells in vitro. Volume 2, Appendix B: Cytogenetics and growth kinetics data, 1.2 GHz [AD-A148867] p 176 N85-19600

Genetic effects of microwave exposure on mammalian cells in vitro, volume 2 [AD-A149347] p 176 N85-19603

CENTRAL NERVOUS SYSTEM

The basic properties of the nervous system and their role in occupational activity p 196 A85-26256

Work capacity of heat and electric power plant operations working 12 hour day and night shifts p 206 N85-18567

CEREBRAL CORTEX

Electrical sources in human somatosensory cortex identification by combined magnetic and potential recordings p 184 A85-25824

CEREBRAL VASCULAR ACCIDENTS

Effect of decimeter-range waves on the aggregation activity of thrombocytes, given different localizations of effects in victims of cerebral insult p 178 A85-23204

CHEMICAL DEFENSE

USAFSAM integration laboratory assessments of the Advanced Chemical Defence Aircrew Respirator (ACDAR) p 200 A85-22756

Life Support System Program Office - 1983 corporate report p 201 A85-22761

CHEMICAL EVOLUTION

Abiotic synthesis of purines and other heterocyclic compounds by the action of electrical discharges p 211 A85-23868

Precambrian fossils and the origins of biologic organization p 211 A85-25667

CHEMORECEPTORS

An analysis of the regulation of noradrenergic secretion by autodreno-receptors and frequency stimulation p 167 A85-23258

Specific glucocorticoid receptors of human muscle cytosol p 182 A85-23309

CHIRAL DYNAMICS

Beta-decay, Bremsstrahlen, and the origin of molecular chirality p 211 A85-23869

CHRONIC CONDITIONS

The age-related aspects of vestibular function in patients with chronic purulent otitis media according to cupulometry data p 181 A85-23264

CIRCULATORY SYSTEM

The correction of microcirculatory disorders from vibrational illness p 179 A85-23208

The effect of hypodynamia on the hemomicrocirculatory bed in rat triceps brachii muscle and its fascia p 166 A85-23233

Management of microcirculatory disorders in vibration sickness p 186 N85-19611

CIVIL AVIATION

A method for studying work activities -- of air navigator p 191 A85-23231

Captain development training at US Air p 196 N85-18012

Management training for cockpit crews at Piedmont flight p 197 N85-18013

Integrated approach to flight crew training p 197 N85-18014

Video concepts in CRM training p 197 N85-18015

Use of simulator scenarios for CRM training p 197 N85-18016

Medically disqualified airline pilots [AD-A149454] p 189 N85-19637

CLIMATOLOGY

Climatological aspect of the epidemiology of acute disturbances of brain circulation (Review) p 180 A85-23249

CLINICAL MEDICINE

Efficiency of the treatment of patients with vibration sickness by means of sinusoidal modulated currents p 179 A85-23212

An evaluation of the effectiveness of treatment based on survival rate tables p 182 A85-23299

Ways to enhance the efficiency of the correction of hypoxic states p 182 A85-23311

Comparative assessment of different treatment modalities in miners with vibration- and noise-induced disease p 186 N85-19610

Management of microcirculatory disorders in vibration sickness p 186 N85-19611

CLOTHING

Investigation of the dynamics of the automicroflora of the skin and fauces, and the bacterial contamination of the underclothes of mine workers p 202 A85-23273

COCKPIT SIMULATORS

Dynamic training devices in CRM training p 197 N85-18018

COCKPITS

USAFSAM integration laboratory assessments of the Advanced Chemical Defence Aircrew Respirator (ACDAR) p 200 A85-22756

The man in the cockpit of a modern commercial aircraft p 205 A85-25511

Error management methods in the cockpits of high-performance aircraft p 205 A85-25512

Simulation p 197 N85-18024

Crewstation assessment of reach as applied to the OH-58A helicopter p 208 N85-19650

[AD-A149413] Impact of future aircombat characteristics on pilot performance and cockpit design p 209 N85-19661

Changing system and display concepts and their impact on aircrew performance p 209 N85-19665

The cockpit of the year 2000: How big a step? p 210 N85-19667

Influence of a perspective cockpit traffic display format on pilot avoidance maneuvers p 210 N85-19668

THE F-18: A new era for human factors

p 210 N85-19671

COGNITION

The dynamics of reflexive operations in productive thinking activity p 191 A85-23227

Neurocognitive pattern analysis of an auditory and visual numeric motor control task. Part 1: Development of methods p 198 N85-18578

[AD-A148809] Study of cognitive styles of students in automated teaching system p 198 N85-19620

Military pilot ergonomics p 208 N85-19655

Some effects of display format variables on the perception of aircraft spatial orientation p 210 N85-19666

COGNITIVE PSYCHOLOGY

Levels of development of the need for cognition p 191 A85-23228

Image of the world and psychological investigation of thinking p 191 A85-23242

Some perspectives on the study and improvement of the cognitive-creative activity of an individual and a group p 191 A85-23276

Interrelationship between learning and development in the process of mastering an occupational activity p 192 A85-23285

COLD ACCLIMATIZATION

Effect of cutaneous denervation of face and trunk on thermoregulatory responses to cold in rats p 171 A85-25701

COLD WEATHER

A systems analysis of alternative concepts for aircrew cold weather clothing p 206 N85-18580

COLLISION AVOIDANCE

Influence of a perspective cockpit traffic display format on pilot avoidance maneuvers p 210 N85-19668

COLOR

Individual differences in chromatic brightness matching p 199 N85-19641

[AD-A148882] The relative effectiveness of red and white light for subsequent dark-adaptation p 199 N85-19642

COLOR CODING

The colours are not on the display - A survey of non-veridical perceptions that may turn up on a colour display p 195 A85-25814

COLOR VISION

Introduction to color vision p 190 A85-22589

A complex method for evaluating the color vision of patients with localized cerebral lesions p 180 A85-23230

The colours are not on the display - A survey of non-veridical perceptions that may turn up on a colour display p 195 A85-25814

Spatial contrast detection for colour patterns under selective chromatic adaptation p 195 A85-25815

A model of a constant color perception pattern for the case of continuous spectral functions p 184 A85-26296

Color measurement and discrimination

[NASA-CR-3824] p 206 N85-18579

COMMERCIAL AIRCRAFT

The man in the cockpit of a modern commercial aircraft p 205 A85-25511

Use of airplanes for loft training p 197 N85-18019

COMMUNICATING

Communications skills for CRM training p 197 N85-18017

The multiple resources model of human performance: Implications for display design p 210 N85-19669

COMPLEX SYSTEMS

Simulation model for assessing the combined effect of engineering and psychological factors on the efficiency of a man-machine system p 203 A85-24036

Grasp of information by the pilot in future combat aircraft p 209 N85-19662

COMPUTER ASSISTED INSTRUCTION

Some principles for the construction of an adaptive training system p 192 A85-23279

Study of cognitive styles of students in automated teaching system p 198 N85-19620

COMPUTER GRAPHICS

Anatomical aspects of the use of computer tomography (Review of the non-Soviet literature) p 166 A85-23241

Scintigraphy and emission computer tomography of the head in the diagnosis of intracranial vascular congestion p 180 A85-23246

COMPUTER PROGRAMS

Development of a complex of programs of spectral EEG analysis for the operational diagnostics of the functional state of human operators p 178 A85-23163

SUBJECT INDEX

- Crewstation assessment of reach as applied to the OH-58A helicopter |AD-A149413| p 208 N85-19650
- COMPUTER SYSTEMS DESIGN**
Dialog system of preparation and presentation of visual information p 198 N85-19622
- COMPUTER SYSTEMS PERFORMANCE**
Man-machine interaction: Operator |AD-A149075| p 207 N85-19648
- COMPUTER TECHNIQUES**
Algorithm for the computer identification and processing of the psychophysiological parameters of human operators in a tracking process p 202 A85-23162
Computer tomography of alveococcosis in the liver p 180 A85-23222
Automation of an investigation procedure using a 16-factor personality questionnaire p 192 A85-23286
Prospects for the use of models of autoregression-sliding mean type for EEG analysis p 182 A85-23306
Integrated approach to flight crew training p 197 N85-18014
- COMPUTERIZED SIMULATION**
A computer model for prediction of pilot performance based on the addition of different weights at various locations on the head p 201 A85-22772
Investigation of the goal-directed motions of a human in an unsupported state p 204 A85-24037
- COMPUTERS**
Methodological problems of man-machine interaction in the solution of mathematical problems p 202 A85-2315
- CONFERENCES**
Colloquium on Control Stations, Cologne, West Germany, October 16, 17, 1984, Reports p 205 A85-25509
- The effects of time delay in man-machine control systems: Implications for design of flight simulator Visual-Display-Delay compensation |AD-P004329| p 205 N85-17983
- Simulator sickness: Sensorimotor disturbances induced in flight simulators |AD-P004334| p 184 N85-17988
- CONSERVATION**
Closed-loop concepts for the Army: Water conservation, recycle, and reuse |AD-A148839| p 207 N85-18581
- CONTRACTION**
An investigation of the isovolumic indices of myocardial contractility in response to directed changes in heart function p 173 A85-26257
- CONTROL**
Problems of psychological support of automated organization control systems p 198 N85-18571
- CONTROL THEORY**
Estimation of the efficiency of two-goal differential-game ergatic control systems p 203 A85-24031
- CONVERSATION**
Communications skills for CRM training p 197 N85-18017
- COOPERATION**
Style of personal contact as a factor in the efficiency of communal activity p 193 A85-23289
- COORDINATION**
Method for the experimental study of visual-motor coordination p 192 A85-23282
- CORONARY CIRCULATION**
The relief characteristics of the internal surface of the cardiac ventricles and Viessen-Thebesian vessels p 180 A85-23238
Effects of exercise training on coronary transport capacity p 171 A85-25705
- CORTICOSTEROIDS**
An electron microscopic and cytochemical investigation of blood lymphocyte subpopulations in association with corticosteroid deficiency p 169 A85-23310
- COSMIC RAYS**
Radiation doses and biological effects of cosmic rays p 165 A85-22853
- COST EFFECTIVENESS**
Low cost training aids and devices p 197 N85-18025
- CRANIUM**
The syncopal state associated with moderate craniocerebral trauma p 179 A85-23220
- CRASH INJURIES**
Improving head crash protection p 201 A85-22770
- CREATIVITY**
Some perspectives on the study and improvement of the cognitive-creative activity of an individual and a group p 191 A85-23276
- CREW PROCEDURES (INFLIGHT)**
Influence of a perspective cockpit traffic display format on pilot avoidance maneuvers p 210 N85-19668
- CROP GROWTH**
The effect of magnetic fields on somatic cell division in plants p 169 A85-23302

- CYTOCHROMES**
Respiratory chain of alkalophilic bacteria |DE84-012558| p 174 N85-18556
- CYTOTOLOGY**
Experimental atherosclerosis in middle-altitude conditions p 165 A85-23201
Cell surface RNA - A possible molecular receptor for adaptogens p 166 A85-23252
Magnetic susceptibility and the magnetic capture of cells p 167 A85-23253
Phagocytosis - Physiological and molecular aspects p 167 A85-23267
- Effect of lethal and superlethal doses of gamma radiation on the activity of lysosomal enzymes in radio-sensitive and radio-resistant rat tissues p 168 A85-23297
- An electron microscopic and cytochemical investigation of blood lymphocyte subpopulations in association with corticosteroid deficiency p 169 A85-23310
Promising methods for early laboratory diagnosis of infectious diseases p 183 A85-25619
Protein metabolism in the muscles following muscular work p 171 A85-25647
Redox processes in the rat myocardium under acute hypoxia p 172 A85-26251
The physical basis for the generation of neuromagnetic fields p 174 A85-26298
- D**
- DARK ADAPTATION**
Effect of extreme peripheral light on dark adaptation |AD-A148923| p 189 N85-19636
The relative effectiveness of red and white light for subsequent dark-adaptation |AD-A148883| p 199 N85-19642
- DATA ACQUISITION**
A method for studying work activities --- of air navigator p 191 A85-23231
- DATA BASE MANAGEMENT SYSTEMS**
Sector suite man-machine functional capabilities and performance requirements |AD-A148881| p 207 N85-19647
- DATA BASES**
Guide to human factors information sources |AD-A149102| p 208 N85-19649
- DATA PROCESSING**
Algorithm for the computer identification and processing of the psychophysiological parameters of human operators in a tracking process p 202 A85-23162
Automation of an investigation procedure using a 16-factor personality questionnaire p 192 A85-23286
A methodology for determining the parameters of a pilot as an information-processing control system p 203 A85-24033
- DATA REDUCTION**
Analysis of a visual performance experiment |DE85-000710| p 200 N85-19645
- DECIMETER WAVES**
Effect of decimeter-range waves on the aggregation activity of thrombocytes, given different localizations of effects in victims of cerebral insult p 178 A85-23204
Effect of decimeter waves on the relative content of T-lymphocytes in the lymphoid organs p 169 A85-23313
- DECISION MAKING**
Some effects of display format variables on the perception of aircraft spatial orientation p 210 N85-19666
- DEOXYRIBONUCLEIC ACID**
Protein synthesis and DNA replication in lymphocytes in an immune response p 167 A85-23266
Evolutionary constraints and the neutral theory --- mutation-caused nucleotide substitutions in DNA p 170 A85-23870
- Genetic effects of microwave exposure on mammalian cells *in vitro*. Volume 2, Appendix A: Cytogenetics and growth kinetics data, 850 MHz |AD-A148866| p 175 N85-19599
Genetic effects of microwave exposure on mammalian cells *in vitro*. Volume 2, Appendix B: Cytogenetics and growth kinetics data, 1.2 GHz |AD-A148867| p 176 N85-19600
Genetic effects of microwave exposure on mammalian cells *in vitro*, volume 2 |AD-A149347| p 176 N85-19603
- DIAGNOSIS**
Development of a complex of programs of spectral EEG analysis for the operational diagnostics of the functional state of human operators p 178 A85-23163
Computer tomography of alveococcosis in the liver p 180 A85-23222
- Experience with the early diagnosis and prevention of the vibration sickness of construction workers p 181 A85-23271

DRUGS

- Investigation of the total activity and distribution of multiple forms of a number of lysosomal glycosidases in subfractions of human leukocytes p 182 A85-23296
Status of the kallikrein-kinin system in blood from the cardiac ventricles in the development dynamics of spontaneous hypertension in rats p 169 A85-23298
Promising methods for early laboratory diagnosis of infectious diseases p 183 A85-25619
- DIETS**
The effect of an iron deficient diet on the formation of bone tissue p 168 A85-23275
- DIFFERENCES**
Individual differences in chromatic brightness matching |AD-A148882| p 199 N85-19641
- DIGITAL COMPUTERS**
Man-machine interaction: Operator |AD-A149075| p 207 N85-19648
- DIGITAL DATA**
An evaluation of system quality metrics for hard-copy and soft-copy displays of digital imagery p 204 A85-24301
- DIGITAL SYSTEMS**
Human performance evaluations of digital image quality p 200 A85-22592
- DISEASES**
The physiology of ultradian rhythms and their role in affecting disease resistance |AD-A148842| p 185 N85-18575
- DISPLAY DEVICES**
Introduction to color vision p 190 A85-22589
Laser optometric assessment of visual display viewability p 200 A85-22590
Human performance evaluations of digital image quality p 200 A85-22592
Reduction of display artifacts by random sampling p 204 A85-24291
The colours are not on the display - A survey of non-veridical perceptions that may turn up on a colour display p 195 A85-25814
Spatial contrast detection for colour patterns under selective chromatic adaptation p 195 A85-25815
The effects of time delay in man-machine control systems: Implications for design of flight simulator Visual-Display-Delay compensation |AD-P004329| p 205 N85-17983
Dialog system of preparation and presentation of visual information p 198 N85-19622
Sector suite man-machine functional capabilities and performance requirements |AD-A148881| p 207 N85-19647
Human Factors Considerations in High Performance Aircraft |AGARD-CP-371| p 208 N85-19653
Aircrew and avionics: Friends or Foes? p 208 N85-19654
Observations of physiological and psychological effects of terrain following flight based on in-flight test experience p 209 N85-19657
Changing system and display concepts and their impact on aircrew performance p 209 N85-19665
The cockpit of the year 2000: How big a step? p 210 N85-19667
Influence of a perspective cockpit traffic display format on pilot avoidance maneuvers p 210 N85-19668
The multiple resources model of human performance: Implications for display design p 210 N85-19669
The F-18: A new era for human factors p 210 N85-19671
Aircrew-aircraft integration issues in future US Army helicopters p 210 N85-19672
- DIVING (UNDERWATER)**
Hydrogen-oxygen (hydrox) breathing at 1.3MPa |FOA-C-58015-H1| p 186 N85-18577
- DOSIMETERS**
Experience with a centralized provision for individual radiation-dose monitoring p 202 A85-23270
- DRUGS**
Application of active oculography and electroneuromyography to analyze the effect of drugs p 178 A85-23165
Effect of a low-frequency alternating magnetic field on the course of pyrogenic fever p 165 A85-23202
Hematological complications of drug therapy p 180 A85-23223
Cell surface RNA - A possible molecular receptor for adaptogens p 166 A85-23252
Efficiency of the Eleutherococcus treatment of enuresis p 181 A85-23261
The effect of isatin and its derivatives on certain indices of carbohydrate metabolism p 168 A85-23295
The pharmacological correction of fatigue --- Russian book p 169 A85-23725
Change in the response of the heart to posthypoxic reoxygenation after injection of superoxide dismutase and its inhibitor p 171 A85-25617

DYNAMIC CONTROL

Changes in redox processes in rats with anemia due to alkylating preparations in alpine climatic conditions
p 172 A85-26253

DYNAMIC CONTROL

Force feedback in a manipulator control system
p 205 A85-25584

E

EAR

Quantum noise and the threshold of hearing
p 170 A85-25043

ECHO SOUNDING

Significance of ultrasonic echo studies for human anatomy
p 180 A85-23240

ECOLOGY

The connection between the parameters of sodium and potassium distribution and the contractile properties of muscles
p 169 A85-23307

EDUCATION

Interpersonal activity in conditions of group learning
p 192 A85-23278

Interrelationship between learning and development in the process of mastering an occupational activity
p 192 A85-23285

Innovative approaches to recurrent training
p 197 A85-18028

USSR report: Life sciences. Biomedical and behavioral sciences
[JPRS-UBB-85-011] p 177 N85-19616

Study of cognitive styles of students in automated teaching system
p 198 N85-19620

EFFECTIVENESS

An evaluation of the effectiveness of treatment based on survival rate tables
p 182 A85-23299

EFFERENT NERVOUS SYSTEMS

The variability of functional system structure during physical activity and in the presence of fatigue
p 183 A85-25643

EJECTION INJURIES

Restraint improvement retrofit program - Objectives and requirements
p 200 A85-22759

Factors influencing the incidence and severity of 'ejection associated' neck injuries sustained by U.S. Navy ejectionees 1 January 1969 through 31 December 1979 - A preliminary report
p 177 A85-22776

EJECTION SEATS

Advanced emergency breathing systems
p 201 A85-22773

ELECTRIC DISCHARGES

Abiotic synthesis of purines and other heterocyclic compounds by the action of electrical discharges
p 211 A85-23868

ELECTRIC FIELD STRENGTH

Efficiency of the treatment of patients with vibration sickness by means of sinusoidal modulated currents
p 179 A85-23212

ELECTRIC POWER PLANTS

Work physiology of operating personnel at power plants in arid regions
p 207 N85-19606

ELectRIC STIMULI

Temporary endocardial electrocardiostimulation during disturbances of heart rhythm and conduction
p 181 A85-23260

Neurochemical mechanisms for the regulation of pain sensitivity
p 173 A85-26286

The locomotor region of the truncus cerebri and the hypothesis of a locomotor column
p 174 A85-26287

ELECTRO-OPTICS

The cockpit of the year 2000: How big a step?
p 210 N85-19667

ELECTROCARDIOGRAPHY

Amplitude characteristics of the electric field of the heart
p 181 A85-23262

ELECTROCHEMISTRY

Bioelectrochemistry 2: Membrane phenomena
[AD-A149132] p 176 N85-19602

ELECTROENCEPHALOGRAPHY

Slow negative potentials and probabilistic prediction --- for operator performance evaluation
p 178 A85-23160

Development of a complex of programs of spectral EEG analysis for the operational diagnostics of the functional state of human operators
p 178 A85-23163

Psychological aspects of the phenomenon of spatial synchronization of potentials
p 192 A85-23280

Prospects for the use of models of autoregression-sliding mean type for EEG analysis
p 182 A85-23306

The dynamics of an extremely slow omega-potential and EEG spatial synchronization in the presence of muscle fatigue
p 183 A85-25646

Neurocognitive pattern analysis of an auditory and visual numeric motor control task. Part 1: Development of methods
[AD-A148809] p 198 N85-18578

Effects of partial deprivation of slow-wave sleep on sleep-wakefulness cycles
p 187 N85-19613

ELECTROMAGNETIC RADIATION

Hygienic standards for electromagnetic radiation in the home
p 168 A85-23269

Methodical approaches to determination of sanitation protective zone dimensions around TV centers and TV retransmitters
p 185 N85-18563

ELECTROMAGNETIC SCATTERING

Scattering of electromagnetic waves by human body and its applications
p 185 N85-18572

ELECTROMAGNETIC WAVE TRANSMISSION

Methodical approaches to determination of sanitation protective zone dimensions around TV centers and TV retransmitters
p 185 N85-18563

ELECTROMECHANICS

An optical study of electromechanical coupling in heart fibers
p 167 A85-23256

ELECTROMYOGRAPHY

Application of active oculography and electroneuromyography to analyze the effect of drugs
p 178 A85-23165

ELECTRON MICROSCOPY

An electron microscopic and cytochemical investigation of blood lymphocyte subpopulations in association with corticosteroid deficiency
p 169 A85-23310

ELECTROPHORESIS

The genetic similarity of man and the anthropoid apes
p 166 A85-23225

The mechanism of variations in erythrocyte electrophoretic mobility in response the UHF irradiation
p 167 A85-23254

ELECTROPHYSIOLOGY

Electrosleep therapy advanced at medical institute
p 188 N85-19623

EMERGENCIES

Rapid monitoring and prediction of the psychophysiological state of an operator during the simulation of emergency situations
p 190 A85-23159

EMERGENCY BREATHING TECHNIQUES

Advanced emergency breathing systems
p 201 A85-22773

EMOTIONAL FACTORS

Adaptivity of the eye-hand system of a human operator
p 190 A85-23154

Objective evaluation of vegetovascular dystonia and psychoemotional disturbances in patients with vibration sickness
p 179 A85-23214

EMSS

USSR report: Life sciences. Biomedical and behavioral sciences
[JPRS-UBB-85-011] p 177 N85-19616

EMOTIONS

Functional role of type of person's temperament in individual and mutual activity
p 198 N85-19621

Electrosleep therapy advanced at medical institute
p 188 N85-19623

Methods of monitoring mental work efficiency, emotional activity
p 199 N85-19627

ENDOCRINOLOGY

Endocrine structure of the kidneys in hypertensive disease
p 181 A85-23263

Status of the kallikrein-kinin system in blood from the cardiac ventricles in the development dynamics of spontaneous hypertension in rats
p 169 A85-23298

The function of the adrenal cortex and the ovaries in normal subjects and in patients with iron deficiency anemia from an arid region during adaptation to mountain conditions
p 184 A85-26260

The physiological role of adrenergic elements of the hypothalamus in the regulation of hypothalamo-adenohypophyseal systems of adaptation
p 174 A85-26288

ENERGY CONVERSION

The photosynthetic apparatus of bacteria as a converter of the energy of light into electrical energy
p 170 A85-24650

ENERGY TRANSFER

Energy transfer in plants in weightlessness
p 170 A85-24193

ENVIRONMENT SIMULATION

Rapid monitoring and prediction of the psychophysiological state of an operator during the simulation of emergency situations
p 190 A85-23159

Growth of soil bacteria in presence of Martian soil analog, carbon dioxide and hydrogen peroxide
p 175 N85-18560

ENVIRONMENTS

USSR report: Life sciences. Biomedical and behavioral sciences
[JPRS-UBB-85-002] p 174 N85-18559

ENZYME ACTIVITY

The use of enzymes to correct the immune response under vibration loading
p 165 A85-23215

Alcohol dehydrogenase in the blood serum of healthy persons and of patients with chronic alcoholism
p 182 A85-23292

SUBJECT INDEX

Investigation of the total activity and distribution of multiple forms of a number of lysosomal glycosidases in subfractions of human leukocytes
p 182 A85-23296

Effect of lethal and superlethal doses of gamma radiation on the activity of lysosomal enzymes in radio-sensitive and radio-resistant rat tissues
p 168 A85-23297

Change in ornithine carbamoyltransferase activity in rats after X-ray irradiation and the administration of a vitamin-coenzyme complex
p 170 A85-24026

Tyrosine administration enhances dopamine synthesis and release in light-activated rat retina
p 170 A85-24500

Specific differences and seasonal fluctuations in blood serum enzyme activity in experimental animals
p 172 A85-26252

EPIDEMIOLOGY

Climatological aspect of the epidemiology of acute disturbances of brain circulation (Review)
p 180 A85-23249

USSR report: Life sciences. Biomedical and behavioral sciences
[JPRS-UBB-85-002] p 174 N85-18559

EPINEPHRINE

Epinephrine is unessential for stimulation of liver glycogenolysis during exercise
p 172 A85-25708

EPITHELIUM

The morphological basis of a 'minimization function' for the nephron epithelium during uniform hyperthermia
p 169 A85-23301

ERRORS

Analysis of a visual performance experiment
[DE85-000710] p 200 N85-19645

ERYTHROCYTES

Effect of low-frequency acoustic oscillations and certain erythrocyte membrane components in vitro
p 165 A85-23218

The mechanism of variations in erythrocyte electrophoretic mobility in response the UHF irradiation
p 167 A85-23254

ESCAPE SYSTEMS

USAF Aerospace Biotechnology Research and Development
p 200 A85-22755

Restraint improvement retrofit program - Objectives and requirements
p 200 A85-22759

ESTROGENS

The function of the adrenal cortex and the ovaries in normal subjects and in patients with iron deficiency anemia from an arid region during adaptation to mountain conditions
p 184 A85-26260

ETHYL ALCOHOL

Psychophysiological methods for the assessment of the state of a human operator during the controlled effect of ethanol
p 178 A85-23157

Alcohol dehydrogenase in the blood serum of healthy persons and of patients with chronic alcoholism
p 182 A85-23292

ETOIOLOGY

Factors influencing the incidence and severity of 'ejection associated' neck injuries sustained by U.S. Navy ejectionees 1 January 1969 through 31 December 1979 - A preliminary report
p 177 A85-22776

The evaluation of summary vibration load and some biomedical factors in determining the risk of vibration-induced illness in miners
p 179 A85-23206

EUROPEAN SPACE PROGRAMS

Gravity and biological systems: Emphasis on human physiology
[ESA-BR-21] p 174 N85-18558

EVOKED RESPONSE (PSYCHOPHYSIOLOGY)

Psychophysiological study of visual fatigue and recovery of the initial level of work capacity
p 177 A85-23152

Electrical sources in human somatosensory cortex identification by combined magnetic and potential recordings
p 184 A85-25824

EXERCISE PHYSIOLOGY

Changes in the size of the long tubular bones and body mass of rats under physical loads graded according to the time of day
p 166 A85-23235

The structural characteristics of the metacarpal bones of athletes practising a variety of sports
p 180 A85-23236

The variability of functional system structure during physical activity and in the presence of fatigue
p 183 A85-25643

SUBJECT INDEX

Muscle and femoral vein temperatures during short-term maximal exercise in heart failure p 183 A85-25702
 Epinephrine is unessential for stimulation of liver glycogenolysis during exercise p 172 A85-25708
 An estimate of the efficiency of intrapulmonary gas exchange during muscular work in hypoxic conditions p 184 A85-26259
 Blood viscosity responses to acute exercise and aerobic conditioning in women p 185 N85-18573

EXOBIOLOGY

Life on the terrestrial planets? p 211 A85-25674
 Aerospace medicine and biology: A continuing bibliography with indexes [NASA-SP-7011(269)] p 188 N85-19628

EXPOSURE

Effects of overall vibration and noise on operational personnel p 207 N85-19608
 Mercury health effects update: Health issue assessment [PB85-123925] p 190 N85-19639

EXTRATERRESTRIAL LIFE

Life on the terrestrial planets? p 211 A85-25674

EXTRATERRESTRIAL RADIATION

An overview of medical-biological radiation hazards in earth orbits [IAF PAPER 83-256] p 203 A85-23811

EYE (ANATOMY)

The state of the sanguiferous bed of the vascular tunic of the eyeball and retrobulbar formations in association with experimental vascular congestion p 166 A85-23237

A simple analytic expression for the contrast sensitivity of the human eye as a function of brightness p 204 A85-24302

EYE EXAMINATIONS

A complex method for evaluating the color vision of patients with localized cerebral lesions p 180 A85-23230

An analysis of light and technical parameters for visual acuity measurement devices and some methods for their standardization [PB85-123925] p 202 A85-23304

EYE MOVEMENTS

Functional work load on an operator for various regimes of the movement of closed eyes p 191 A85-23244

The muscle as a system of parametric excitation p 167 A85-23257

Panoramic vision and its applications p 192 A85-23277

Visual processing of moving stimuli p 193 A85-24383

Vision in the presence of known natural retinal image motion p 193 A85-24384

Smooth pursuit of small-amplitude sinusoidal motion p 193 A85-24385

Generation-V dual-Purkinje-image eyetracker p 204 A85-25089

Visual flow and direction of locomotion p 196 A85-25825

EYE PROTECTION

A computer model for prediction of pilot performance based on the addition of different weights at various locations on the head p 201 A85-22772

F

F-16 AIRCRAFT

Implications of guidance and control technology on human factors considerations p 209 N85-19656

F-18 AIRCRAFT

The F-18: A new era for human factors p 210 N85-19671

FATIGUE (BIOLOGY)

Psychophysiological study of visual fatigue and recovery of the initial level of work capacity p 177 A85-23152

Assessment of functional reserves of an operator in a state of fatigue p 178 A85-23158

Rapid monitoring and prediction of the psychophysiological state of an operator during the simulation of emergency situations p 190 A85-23159

The pharmacological correction of fatigue --- Russian book p 169 A85-23725

The variability of functional system structure during physical activity and in the presence of fatigue p 183 A85-25643

General features of sensory processes under the effects of extreme stimuli p 171 A85-25644

Methods of monitoring mental work efficiency, emotional activity p 199 N85-19627

FATTY ACIDS

Fatty acid metabolism in the myocardium under normal conditions and in cardiac disease (Survey) p 168 A85-23290

FEEDBACK CONTROL

Force feedback in a manipulator control system p 205 A85-25584

GENETICS

FLIGHT SAFETY

USAF Aerospace Biotechnology Research and Development p 200 A85-22755
 Error management methods in the cockpits of high-performance aircraft p 205 A85-25512
 Dynamic training devices in CRM training p 197 N85-18018

FLIGHT SIMULATION

Simulation of pilot activity on the basis of onboard-recorder data p 203 A85-24034
 Flight crew training technology: A review p 196 N85-18010
 Low-cost training technology p 196 N85-18011
 Innovative approaches to recurrent training p 197 N85-18028

FLIGHT SIMULATORS

The effects of time delay in man-machine control systems: Implications for design of flight simulator Visual-Display-Delay compensation [AD-P004329] p 205 N85-17983
 Simulator sickness: Sensorimotor disturbances induced in flight simulators p 184 N85-17988
 Simulation p 197 N85-18024
 Low cost training aids and devices p 197 N85-18025

FLIGHT TESTS

Observations of physiological and psychological effects of terrain following flight based on in-flight test experience p 209 N85-19657

FLIGHT TRAINING

T-45 training system - Concept and acquisition strategy [SAE PAPER 841588] p 205 A85-25986
 Flight crew training technology: A review p 196 N85-18010
 Low-cost training technology p 196 N85-18011
 Captain development training at US Air p 196 N85-18012
 Management training for cockpit crews at Piedmont flight p 197 N85-18013
 Integrated approach to flight crew training p 197 N85-18014
 Video concepts in CRM training p 197 N85-18015
 Use of simplifier scenarios for CRM training p 197 N85-18016
 Use of airplanes for loft training p 197 N85-18019
 Low cost training aids and devices p 197 N85-18025
 Innovative approaches to recurrent training p 197 N85-18028

FOVEA

Spatial contrast detection for colour patterns under selective chromatic adaptation p 195 A85-25815

FREE ENERGY

Muscle contraction and free energy transduction in biological systems p 172 A85-25822

FUELS

Morbidity and mortality associated with exposure to Otto Fuel II in the U.S. Navy 1966-1979 [AD-A148726] p 185 N85-18574

G

GALVANIC SKIN RESPONSE

Investigation of the functional state of a human operator during the formation of a mental habit p 191 A85-23161

GAME THEORY

Estimation of the efficiency of two-goal differential-game ergatic control systems p 203 A85-24031

GAMMA RAYS

Effect of lethal and superlethal doses of gamma radiation on the activity of lysosomal enzymes in radio-sensitive and radio-resistant rat tissues p 168 A85-23297

GAS EXCHANGE

Influence of G-suit abdominal bladder inflation on gas exchange during +Gz stress p 171 A85-25706

An estimate of the efficiency of intrapulmonary gas exchange during muscular work in hypoxic conditions p 184 A85-26259

GAS MIXTURES

Ways to enhance the efficiency of the correction of hypoxic states p 182 A85-23211
 Hydrogen-oxygen (hydrox) breathing at 1.3MPa [FOA-C-58015-H1] p 186 N85-18577

GENETICS

The genetic similarity of man and the anthropoid apes p 166 A85-23225
 Muscle contraction and free energy transduction in biological systems p 172 A85-25822
 Genetic effects of microwave exposure on mammalian cells in vitro. Volume 2, Appendix A: Cytogenetics and growth kinetics data, 850 MHz [AD-A148866] p 175 N85-19599

GEOCHEMISTRY

Ammonium contents of biotites from Precambrian rocks in Finland - The significance of NH4(+) as a possible chemical fossil p 212 A85-25839

GEOTROPISM

Gravitational adaptation in forest trees p 166 A85-23224

GLOBULINS

Structural studies of human IgA1 and IgA2 immunoglobulins tagged with two different spin-labels p 181 A85-23251

GLYCOCOGENS

Effect of an elevated level of natural radioactivity on glycogen content in peripheral-blood leukocytes of *Microtus oeconomus* Pall p 170 A85-24027

Epinephrine is unessential for stimulation of liver glycogenolysis during exercise p 172 A85-25708

GLYCOLYSIS

Experimental atherosclerosis in middle-altitude conditions p 165 A85-23201

GONADS

The effect of long-term stress on the hypophyse-adrenal-gonad systems in rabbits of various ages p 172 A85-26254

GRATINGS (SPECTRA)

Discontinuity limits for the generation of visual motion aftereffects with sine- and square-wave gratings p 194 A85-24388

Receptive-field symmetry probed using converging gratings p 194 A85-24389

GRAVITATIONAL EFFECTS

Gravitational adaptation in forest trees p 166 A85-23224

Tilt from a head-inverted position produces displacement of visual subjective vertical in the opposite direction p 195 A85-25790

Gravity and biological systems: Emphasis on human physiology [ESA-BR-21] p 174 N85-18558

GRAVITATIONAL PHYSIOLOGY

Gravity and biological systems: Emphasis on human physiology [ESA-BR-21] p 174 N85-18558

GROUP DYNAMICS

Effect of intragroup favoritism in laboratory and natural conditions p 191 A85-23243

Some perspectives on the study and improvement of the cognitive-creative activity of an individual and a group p 191 A85-23276

Interpersonal activity in conditions of group learning p 192 A85-23278

Integrated approach to flight crew training p 197 N85-18014

Video concepts in CRM training p 197 N85-18015

Research opportunities in human behavior and performance [NASA-CR-175473] p 199 N85-19640

H

HABITS

Investigation of the functional state of a human operator during the formation of a mental habit p 191 A85-23161

HAND (ANATOMY)

The structural characteristics of the metacarpal bones of athletes practising a variety of sports p 180 A85-23236

HEAD (ANATOMY)

Reinforcement Kevlar or fiberglass in the HGU helmet shell p 201 A85-22763

Improving head crash protection p 201 A85-22770

A computer model for prediction of pilot performance based on the addition of different weights at various locations on the head p 201 A85-22772

HEAD MOVEMENT

Vision in the presence of known natural retinal image motion p 193 A85-24384

Tilt from a head-inverted position produces displacement of visual subjective vertical in the opposite direction p 195 A85-25790

HEAD-UP DISPLAYS

Some effects of display format variables on the perception of aircraft spatial orientation p 210 N85-19666

HEALTH

Health standards for general vibration p 186 N85-19607

HEALTH PHYSICS

Investigation of the dynamics of the automicrflora of the skin and fauces, and the bacterial contamination of the underclothes of mine workers p 202 A85-23273

Organization and efficiency of a team-basis method for the prophylactic ultraviolet irradiation of coal miners p 182 A85-23300

HEART DISEASES

Fatty acid metabolism in the myocardium under normal conditions and in cardiac disease (Survey) p 168 A85-23290

Muscle and femoral vein temperatures during short-term maximal exercise in heart failure p 183 A85-25702

Medically disqualified airline pilots [AD-A149454] p 189 N85-19637

HEART FUNCTION

An optical study of electromechanical coupling in heart fibers p 167 A85-23256

Amplitude characteristics of the electric field of the heart p 181 A85-23262

Change in the response of the heart to posthypoxic reoxygenation after injection of superoxide dismutase and its inhibitor p 171 A85-25617

Chronic exercise and left ventricular structure and function in healthy human subjects p 184 A85-25703

Effects of exercise training on coronary transport capacity p 171 A85-25705

An investigation of the isovolumic indices of myocardial contractility in response to directed changes in heart function p 173 A85-26257

The role of mitochondria in the regulation of Ca(2+) transmembrane current in myocardial cells p 173 A85-26285

Hemodynamics responses to upright tilt at sea level and high altitude [AD-A148848] p 189 N85-19634

HEART RATE

Effect of daily routine on the functional state of operators according to heart-rhythm parameters p 177 A85-23153

The stress index as an index of the work state of an operator p 178 A85-23164

Temporary endocardial electrocardiostimulation during disturbances of heart rhythm and conduction p 181 A85-23260

Central control of cardiovascular adjustments to exercise p 184 A85-25704

Scattering of electromagnetic waves by human body and its applications p 185 N85-18572

Variability of cardiac rhythm during information loading p 187 N85-19619

HEAT ACCLIMATIZATION

Skeletal muscle metabolism during exercise is influenced by heat acclimation [AD-A148845] p 188 N85-19632

HEAT TOLERANCE

Responses of people to heat load in saunas p 178 A85-23203

Heat stress and personal protective equipment [DE85-003552] p 208 N85-19652

HELICOPTERS

Crewstation assessment of reach as applied to the OH-58A helicopter [AD-A149413] p 208 N85-19650

HELMETS

USAFSAM integration laboratory assessments of the Advanced Chemical Defence Aircrew Respirator (ACDAR) p 200 A85-22756

Life Support System Program Office - 1983 corporate report p 201 A85-22761

Reinforcement Kevlar or fiberglass in the HGU helmet shell p 201 A85-22763

Improving head crash protection p 201 A85-22770

HEMATOLOGY

A computer model for prediction of pilot performance based on the addition of different weights at various locations on the head p 201 A85-22772

Effect of low-frequency acoustic oscillations and certain erythrocyte membrane components in vitro p 165 A85-23218

Hematological complications of drug therapy p 180 A85-23223

Magnetic susceptibility and the magnetic capture of cells p 167 A85-23253

Alcohol dehydrogenase in the blood serum of healthy persons and of patients with chronic alcoholism p 182 A85-23292

Investigation of the total activity and distribution of multiple forms of a number of lysosomal glycosidases in subfractions of human leukocytes p 182 A85-23296

An electron microscopic and cytochemical investigation of blood lymphocyte subpopulations in association with corticosteroid deficiency p 169 A85-23310

Effect of decimeter waves on the relative content of T-lymphocytes in the lymphoid organs p 169 A85-23313

HEMATOPOIESIS

Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 1: Expression of ABO and Rhesus system antigen p 175 N85-18564

Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 2: Adsorption of alcyan blue by external premembranous components p 175 N85-18565

HEMODYNAMIC RESPONSES

Responses of people to heat load in saunas p 178 A85-23203

The state of the central and cerebral hemodynamics in normal subjects and in patients with incipient cerebral circulation insufficiency p 180 A85-23247

An investigation of the cerebral hemodynamics of workers exposed to industrial noise p 181 A85-23265

Mechanism for the increase of arterial pressure in a state of rest and during physical exercise in patients with hypertension p 182 A85-23312

Change in the response of the heart to posthypoxic reoxygenation after injection of superoxide dismutase and its inhibitor p 171 A85-25617

Maximal blood-circulation modes p 183 A85-25648

Changes in central hemodynamic parameters under the influence of volume loading in a healthy state, and during experimental myocardial infarction p 173 A85-26258

HEMODYNAMICS

The effect of hypodynamia on the hemomicrocirculatory bed in rat triceps brachii muscle and its fascia p 166 A85-23233

Hemodynamics responses to upright tilt at sea level and high altitude [AD-A148848] p 189 N85-19634

HETEROCYCLIC COMPOUNDS

Abiotic synthesis of purines and other heterocyclic compounds by the action of electrical discharges p 211 A85-23868

HIBERNATION

Suspended animation for space flight p 172 A85-25832

HIGH ALTITUDE

Hemodynamics responses to upright tilt at sea level and high altitude [AD-A148848] p 189 N85-19634

HISTOCHEMICAL ANALYSIS

Some methodological approaches to predicting the functional state of the body associated with hazardous environmental factors p 167 A85-23268

An electron microscopic and cytochemical investigation of blood lymphocyte subpopulations in association with corticosteroid deficiency p 169 A85-23310

HISTOLOGY

The structure of the renal artery wall during restricted motor activity p 166 A85-23234

The relief characteristics of the internal surface of the cardiac ventricles and Viessen-Thebesian vessels p 180 A85-23238

Endocrine structure of the kidneys in hypertensive disease p 181 A85-23263

The morphological basis of a 'minimization function' for the nephron epithelium during uniform hyperthermia p 169 A85-23301

HISTORIES

Flight crew training technology: A review p 196 N85-18010

HORIZONTAL ORIENTATION

Meridional anisotropy of spatial displacement detection p 195 A85-25791

HORMONE METABOLISMS

An analysis of the regulation of noradrenaline secretion by autoadreno-receptors and frequency stimulation p 167 A85-23258

The function of the adrenal cortex and the ovaries in normal subjects and in patients with iron deficiency anemia from an arid region during adaptation to mountain conditions p 184 A85-26260

The physiological role of adrenergic elements of the hypothalamus in the regulation of hypothalamo-adenohypophyseal systems of adaptation p 174 A85-26288

Effect of modulated ultrahigh frequency field on behavior and hormone level in female rats under emotional stress p 175 N85-18562

HUMAN BEHAVIOR

Redundancy as a principle of the programming activity of the brain p 169 A85-23303

Communications skills for CRM training p 197 N85-18017

USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-85-011] p 177 N85-19616

Functional role of type of person's temperament in individual and mutual activity p 198 N85-19621

Research opportunities in human behavior and performance [NASA-CR-175473] p 199 N85-19640

Aircrew-aircraft integration issues in future US Army helicopters p 210 N85-19672

SUBJECT INDEX

HUMAN BEINGS

- The genetic similarity of man and the anthropoid apes p 166 A85-23225
The complex study of man - The place of psychology p 191 A85-23250
Suspended animation for space flight p 172 A85-25832
Management of vibration sickness in coal mines by hyperbaric oxygenation p 186 N85-19609
Comparative assessment of different treatment modalities in miners with vibration- and noise-induced disease p 186 N85-19610
Aircraft noise effects: An interdisciplinary study of the effects of aircraft noise on man. Part 1: Basic report |NASA-TM-75819| p 188 N85-19629
Health assessment document for carbon tetrachloride |PB85-124196| p 190 N85-19638

HUMAN BODY

- Significance of ultrasonic echo studies for human anatomy p 180 A85-23240
Investigation of the goal-directed motions of a human in an unsupported state p 204 A85-24037
Gravity and biological systems: Emphasis on human physiology |ESA-BR-21| p 174 N85-18558
Scattering of electromagnetic waves by human body and its applications p 185 N85-18572
Health standards for general vibration p 186 N85-19607

HUMAN FACTORS ENGINEERING

- Introduction to color vision p 190 A85-22589
Laser optometric assessment of visual display p 200 A85-22590
Immersion suits, past and present p 201 A85-22771
Spacesuit development - The American experience p 202 A85-23123
Human factors in robotics p 202 A85-23198
USSR report: Life sciences. Biomedical and behavioral sciences |JPRS-UBB-85-002| p 174 N85-18559
Role of engineering psychology p 197 N85-18561
Be healthy, pilot p 188 N85-19626
Guide to human factors information sources |AD-A149102| p 208 N85-19649
Human Factors Considerations in High Performance Aircraft |AGARD-CP-371| p 208 N85-19653
Aircrew and avionics: Friends or Foes? p 208 N85-19654
Military pilot ergonomics p 208 N85-19655
Implications of guidance and control technology on human factors considerations p 209 N85-19656
Observations of physiological and psychological effects of terrain following flight based on in-flight test experience p 209 N85-19657
Impact of future aircombat characteristics on pilot performance and cockpit design p 209 N85-19661
Changing system and display concepts and their impact on aircrew performance p 209 N85-19665
Some effects of display format variables on the perception of aircraft spatial orientation p 210 N85-19666
Pilot workload, performance and aircraft control automation p 210 N85-19670
The F-18: A new era for human factors p 210 N85-19671
Aircrew-aircraft integration issues in future US Army helicopters p 210 N85-19672

HUMAN PATHOLOGY

- The evaluation of summary vibration load and some biomedical factors in determining the risk of vibration-induced illness in miners p 179 A85-23206
A comparative evaluation of various methods for the treatment of miners with vibration-induced and noise-induced pathologies p 179 A85-23207
The correction of microcirculatory disorders from vibrational illness p 179 A85-23208
Efficiency of the treatment of patients with vibration sickness by means of sinusoidal modulated currents p 179 A85-23212
Treatment of vibration sickness in coal miners by means of hyperbaric oxygenation p 179 A85-23213
Computer tomography of alveococcosis in the liver p 180 A85-23222
The hemodynamics of various stages of nighttime sleep in patients with preliminary symptoms of cerebral hemodynamic deficiency p 180 A85-23248
Climatological aspect of the epidemiology of acute disturbances of brain circulation (Review) p 180 A85-23249
Efficiency of the Eleutherococcus treatment of enuresis p 181 A85-23261
The age-related aspects of vestibular function in patients with chronic purulent otitis media according to cupulometry data p 181 A85-23264

Experience with the early diagnosis and prevention of the vibration sickness of construction workers p 181 A85-23271

Alcohol dehydrogenase in the blood serum of healthy persons and of patients with chronic alcoholism p 182 A85-23292

An evaluation of the effectiveness of treatment based on survival rate tables p 182 A85-23299

Specific glucocorticoid receptors of human muscle cytosol p 182 A85-23309

HUMAN PERFORMANCE

- Human performance evaluations of digital image quality p 200 A85-22592
Activity, act, and the psychic as a process p 191 A85-23226
The dynamics of reflexive operations in productive thinking activity p 191 A85-23227
Work capacity of heat and electric power plant operations working 12 hour day and night shifts p 206 N85-18567

Success in learning occupation of chemical production technician as function of certain personality traits and development of psychophysiological functions p 206 N85-18568

Hydrogen-oxygen (hydrox) breathing at 1.3MPa p 186 N85-18577

Neurocognitive pattern analysis of an auditory and visual numeric motor control task. Part 1: Development of methods |AD-A148809| p 198 N85-18578

Research opportunities in human behavior and performance |NASA-CR-175473| p 199 N85-19640

The multiple resources model of human performance: Implications for display design p 210 N85-19669

HUMAN REACTIONS

Slow negative potentials and probabilistic prediction --- for operator performance evaluation p 178 A85-23160

A method for comparing the simple sensorimotor responses of interacting operators p 202 A85-23166

The effect of success and failure on the human functional state p 191 A85-23229

Interpersonal activity in conditions of group learning p 192 A85-23278

An investigation of the psychological aspects of individual manifestations of sociability in humans p 192 A85-23281

The basic properties of the nervous system and their role in occupational activity p 196 A85-26256

Functional role of type of person's temperament in individual and mutual activity p 198 N85-19621

Restructuring of the process of visual recognition as perception conditions alter p 199 N85-19624

HUMAN RELATIONS

A method for comparing the simple sensorimotor responses of interacting operators p 202 A85-23166

Interpersonal activity in conditions of group learning p 192 A85-23278

Style of personal contact as a factor in the efficiency of communal activity p 193 A85-23289

HUMAN TOLERANCES

General features of sensory processes under the effects of extreme stimuli p 171 A85-25644

Aircraft noise effects: An inter-disciplinary study of the effect of aircraft noise on man. Part 3: Supplementary analyses of the social-scientific portion of the study on aircraft noise conducted by the DFG |NASA-TM-75802| p 188 N85-19631

Tolerance, fatigue, physiological and performance effects of sustained and oscillating lateral accelerations p 190 N85-19659

HYDROGEN

Hydrogen-oxygen (hydrox) breathing at 1.3MPa |FOA-C-58015-H1| p 186 N85-18577

HYDROGEN PRODUCTION

Artificial photosynthesis with algal and reconstituted systems |DE85-002557| p 176 N85-19604

HYGIENE

Hygienic standards for electromagnetic radiation in the home p 168 A85-23269

HYPERBARIC CHAMBERS

A comparative evaluation of various methods for the treatment of miners with vibration-induced and noise-induced pathologies p 179 A85-23207

Treatment of vibration sickness in coal miners by means of hyperbaric oxygenation p 179 A85-23213

Management of vibration sickness in coal mines by hyperbaric oxygenation p 186 N85-19609

HYPERCAPNIA

Ventilation and acid-base balance in awake dogs exposed to heat and CO2 p 172 A85-25709

IMAGE PROCESSING

HYPERTENSION

The morphofunctional characteristics of intraorgan arterial vessels in the kidney in the normal state and in certain cardiovascular diseases p 180 A85-23239

Endocrine structure of the kidneys in hypertensive disease p 181 A85-23263

Status of the kallikrein-kinin system in blood from the cardiac ventricles in the development dynamics of spontaneous hypertension in rats p 169 A85-23298

HYPERTHERMIA

Responses of people to heat load in saunas p 178 A85-23203

Physiological characterization of the work of the operating personnel of a power system in an arid zone p 179 A85-23219

The mechanism of variations in erythrocyte electrophoretic mobility in response the UHF irradiation p 167 A85-23254

The morphological basis of a 'minimization function' for the nephron epithelium during uniform hyperthermia p 169 A85-23201

Ventilation and acid-base balance in awake dogs exposed to heat and CO2 p 172 A85-25709

HYPODYNAMIA

The effect of hypodynamia on the hemomicrocirculatory bed in rat triceps brachii muscle and its fascia p 166 A85-23233

HYPOKINESIA

Certain conclusions and prospects of study pertaining to the vascular system in the case of limitations on motor activity p 166 A85-23232

The structure of the renal artery wall during restricted motor activity p 166 A85-23234

Study of bodily functional status and quality of controlling action of power unit operators with various intensities of labor p 206 N85-18569

HYPOTHALAMUS

The physiological role of adrenergic elements of the hypothalamus in the regulation of hypothalamo-adenohypophyseal systems of adaptation p 174 A85-26288

Influence of hyperthermia on body temperature and content of catecholamines in white rat hypothalamus p 176 N85-19615

HYPOTHERMIA

Angiotensin II. - Induced hypothermia in rats p 171 A85-25707

Suspended animation for space flight p 172 A85-25832

Influence of hyperthermia on body temperature and content of catecholamines in white rat hypothalamus p 176 N85-19615

HYPOXIA

Changes in the composition of mitochondrial lipids in the presence of dinitrophenol under hypoxic conditions p 168 A85-23291

The effect of isatin and its derivatives on certain indices of carbohydrate metabolism p 168 A85-23295

Ways to enhance the efficiency of the correction of hypoxic states p 182 A85-23311

Change in the response of the heart to posthypoxic reoxygenation after injection of superoxide dismutase and its inhibitor p 171 A85-25617

Redox processes in the rat myocardium under acute hypoxia p 172 A85-26251

Changes in redox processes in rats with anemia due to alkylating preparations in alpine climatic conditions p 172 A85-26253

An estimate of the efficiency of intrapulmonary gas exchange during muscular work in hypoxic conditions p 184 A85-26259

ILLUMINATING

Analysis of a visual performance experiment |DE85-000710| p 200 N85-19645

ILLUMINATORS

Analysis of a visual performance experiment |DE85-000710| p 200 N85-19645

IMAGE CONTRAST

A simple analytic expression for the contrast sensitivity of the human eye as a function of brightness p 204 A85-24302

Suprathreshold contrast perception at different luminance levels p 195 A85-25774

IMAGE MOTION COMPENSATION

Vision in the presence of known natural retinal image motion p 193 A85-24384

Smooth pursuit of small-amplitude sinusoidal motion p 193 A85-24385

IMAGE PROCESSING

An evaluation of system quality metrics for hard-copy and soft-copy displays of digital imagery p 204 A85-24301

IMAGE RESOLUTION

- Visual processing of moving stimuli p 193 A85-24383
- ### IMAGE RESOLUTION
- Human performance evaluations of digital image quality p 200 A85-22592
- Spatial and temporal parameters of motion detection in the peripheral visual field p 193 A85-24387
- ### IMAGE VELOCITY SENSORS
- Model of human visual-motion sensing p 194 A85-24393
- ### IMMUNOLOGY
- The use of enzymes to correct the immune response under vibration loading p 165 A85-23215
- Structural studies of human IgA1 and IgA2 immunoglobulins tagged with two different spin-labels p 181 A85-23251
- Protein synthesis and DNA replication in lymphocytes in an immune response p 167 A85-23266
- Phagocytosis - Physiological and molecular aspects p 167 A85-23267
- Effect of decimeter waves on the relative content of T-lymphocytes in the lymphoid organs p 169 A85-23213
- Contradictory results in interferon research p 170 A85-24499
- Promising methods for early laboratory diagnosis of infectious diseases p 183 A85-25619
- ### IMPACT ACCELERATION
- Biomechanical studies of impact acceleration research [AD-A149077] p 176 N85-19601
- ### INDICATING INSTRUMENTS
- The multiple resources model of human performance: Implications for display design p 210 N85-19669
- ### INDUSTRIAL SAFETY
- Hygienic standardization of whole-body vibration p 178 A85-23205
- Dose assessment of noise load on tractor operators in agriculture p 179 A85-23210
- Treatment of vibration sickness in coal miners by means of hyperbaric oxygenation p 179 A85-23213
- Noise protection of workers in the sawmill and wood-processing industry p 179 A85-23216
- Organization and efficiency of a team-basis method for the prophylactic ultraviolet irradiation of coal miners p 182 A85-23300
- Study of bodily functional status and quality of controlling action of power unit operators with various intensities of labor p 206 N85-18569
- USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-85-008] p 176 N85-19605
- Health standards for general vibration p 186 N85-19607
- Effects of overall vibration and noise on operational personnel p 207 N85-19608
- Comparative assessment of different treatment modalities in miners with vibration- and noise-induced disease p 186 N85-19610
- ### INFECTIOUS DISEASES
- Promising methods for early laboratory diagnosis of infectious diseases p 183 A85-25619
- ### INFORMATION ADAPTIVE SYSTEM
- A methodology for determining the parameters of a pilot as an information-processing control system p 203 A85-24033
- ### INFORMATION RETRIEVAL
- Guide to human factors information sources [AD-A149102] p 208 N85-19649
- ### INFORMATION SYSTEMS
- Guide to human factors information sources [AD-A149102] p 208 N85-19649
- The multiple resources model of human performance: Implications for display design p 210 N85-19669
- ### INSULIN
- Epinephrine is unessential for stimulation of liver glycogenolysis during exercise p 172 A85-25708
- ### INTERACTIVE CONTROL
- Methodological problems of man-machine interaction in the solution of mathematical problems p 202 A85-23315
- ### INTERFACES
- Man-machine interaction: Operator [AD-A149075] p 207 N85-19648
- ### INTERFERON
- Contradictory results in interferon research p 170 A85-24499
- ### IONIC DIFFUSION
- A simulation of the regional deposition of air ions in human lungs p 181 A85-23255
- ### IONIC MOBILITY
- The role of mitochondria in the regulation of Ca^{2+} transmembrane current in myocardial cells p 173 A85-26285
- The effect of inert gases on ion transport across the erythrocyte membrane [AD-A148869] p 189 N85-19635

IRON

- The effect of an iron deficient diet on the formation of bone tissue p 168 A85-23275

ISCHEMIA

- The morphofunctional characteristics of intraorgan arterial vessels in the kidney in the normal state and in certain cardiovascular diseases p 180 A85-23239

- The effect of deficient blood supply in the heart on ATPase systems p 168 A85-23293

K

KEVLAR (TRADEMARK)

- Reinforcement Kevlar or fiberglass in the HGU helmet shell p 201 A85-22763

KIDNEY DISEASES

- Severe renal insufficiency due to hyperuricemia and urate nephrolithiasis p 180 A85-23221

KIDNEYS

- Endocrine structure of the kidneys in hypertensive disease p 181 A85-23263

L

LABYRINTH

- A mechanism for the effect of noise on the labyrinth p 165 A85-23209

LASER APPLICATIONS

- Laser optometric assessment of visual display viewability p 200 A85-22590

- USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-85-002] p 174 N85-18559

LATERAL OSCILLATION

- Tolerance, fatigue, physiological and performance effects of sustained and oscillating lateral accelerations p 190 N85-19659

LEADERSHIP

- Conceptual model of critical requirements for effective pilot performance in high performance aircraft p 209 N85-19663

LEARNING

- Investigation of the functional state of a human operator during the formation of a mental habit p 191 A85-23161

- The effect of paradoxical sleep deprivation on the learning of the active avoidance reaction p 173 A85-26261

LETHALITY

- Effect of lethal and superlethal doses of gamma radiation on the activity of lysosomal enzymes in radio-sensitive and radio-resistant rat tissues p 168 A85-23297

LEUKOCYTES

- Investigation of the total activity and distribution of multiple forms of a number of lysosomal glycosidases in subfractions of human leukocytes p 182 A85-23296

- Effect of an elevated level of natural radioactivity on glycogen content in peripheral-blood leukocytes of Micromys musculus Pall p 170 A85-24027

LIFE SCIENCES

- USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-85-007] p 175 N85-18566

- USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-85-008] p 176 N85-19605

- USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-85-011] p 177 N85-19616

- USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-85-009] p 177 N85-19625

LIFE SUPPORT SYSTEMS

- USAF Aerospace Biotechnology Research and Development p 200 A85-22755

- Life Support System Program Office - 1983 corporate report p 201 A85-22761

LIGHT (VISIBLE RADIATION)

- The relative effectiveness of red and white light for subsequent dark-adaptation p 199 N85-19642

LIGHT ADAPTATION

- Effect of extreme peripheral light on dark adaptation p 189 N85-19636

LIGHT SCATTERING

- Effect of extreme peripheral light on dark adaptation [AD-A148923] p 189 N85-19636

LIPID METABOLISM

- Fatty acid metabolism in the myocardium under normal conditions and in cardiac disease (Survey) p 168 A85-23290

- Changes in the composition of mitochondrial lipids in the presence of dinitrophenol under hypoxic conditions p 168 A85-23291

SUBJECT INDEX

LIVER

- Computer tomography of alveococcosis in the liver p 180 A85-23222

- Effect of methylmethacrylate and acrylamide on the microsomal oxidation system in the rat liver p 168 A85-23294

LOGIC DESIGN

- Dialog system of preparation and presentation of visual information p 198 N85-19622

LOGIC PROGRAMMING

- Dialog system of preparation and presentation of visual information p 198 N85-19622

LONG DURATION SPACE FLIGHT

- Suspended animation for space flight p 172 A85-25832

LONG TERM EFFECTS

- Chronic exercise and left ventricular structure and function in healthy human subjects p 184 A85-25703

- The effect of long-term stress on the hypophyseal-adrenal-gonad systems in rabbits of various ages p 172 A85-26254

LOW FREQUENCIES

- Effect of low-frequency acoustic oscillations and certain erythrocyte membrane components in vitro p 165 A85-23218

LUMENS

- An analysis of light and technical parameters for visual acuity measurement devices and some methods for their standardization p 202 A85-23304

LUMINANCE

- Suprathreshold contrast perception at different luminance levels p 195 A85-25774

LUMINOUS INTENSITY

- Individual differences in chromatic brightness matching [AD-A148882] p 199 N85-19641

- The relative effectiveness of red and white light for subsequent dark-adaptation [AD-A148883] p 199 N85-19642

LUNGS

- A simulation of the regional deposition of air ions in human lungs p 181 A85-23255

LYMPHOCYTES

- Protein synthesis and DNA replication in lymphocytes in an immune response p 167 A85-23266

- An electron microscopic and cytochemical investigation of blood lymphocyte subpopulations in association with corticosteroid deficiency p 169 A85-23310

- Effect of decimeter waves on the relative content of T-lymphocytes in the lymphoid organs p 169 A85-23313

LYSOZYME

- The use of enzymes to correct the immune response under vibration loading p 165 A85-23215

- Investigation of the total activity and distribution of multiple forms of a number of lysosomal glycosidases in subfractions of human leukocytes p 182 A85-23296

- Effect of lethal and superlethal doses of gamma radiation on the activity of lysosomal enzymes in radio-sensitive and radio-resistant rat tissues p 168 A85-23297

M

MAGNETIC EFFECTS

- Effect of a low-frequency alternating magnetic field on the course of pyrogenic fever p 165 A85-23202

- Magnetic susceptibility and the magnetic capture of cells p 167 A85-23253

- The effect of magnetic fields on somatic cell division in plants p 169 A85-23302

MALES

- Skeletal muscle metabolism during exercise is influenced by heat acclimation [AD-A148845] p 188 N85-19632

- Assessment of muscle strength and prediction of lifting capacity in US Army personnel [AD-A148846] p 189 N85-19633

- Hemodynamics responses to upright tilt at sea level and high altitude [AD-A148848] p 189 N85-19634

MAMMALS

- Genetic effects of microwave exposure on mammalian cells in vitro. Volume 2, Appendix A: Cytogenetics and growth kinetics data, 850 MHz [AD-A148861] p 175 N85-19599

- Genetic effects of microwave exposure on mammalian cells in vitro. Volume 2, Appendix B: Cytogenetics and growth kinetics data, 1.2 GHz [AD-A148867] p 176 N85-19600

MAN ENVIRONMENT INTERACTIONS

- Some methodological approaches to predicting the functional state of the body associated with hazardous environmental factors p 167 A85-23268

MAN MACHINE SYSTEMS

- A system-level approach to automation research p 202 A85-23197
- Human factors in robotics p 202 A85-23198
- Effect of total-body vibration and noise on the functional state of human operators p 179 A85-23211
- The principles of experimental setup in models of complex human operator activities p 192 A85-23283
- Methodological problems of man-machine interaction in the solution of mathematical problems p 202 A85-23284
- A methodology for determining the parameters of a pilot as an information-processing control system p 203 A85-24033
- Certain problems in the automated assessment of the operating efficiency of man-machine systems p 203 A85-24035
- Simulation model for assessing the combined effect of engineering and psychological factors on the efficiency of a man-machine system p 203 A85-24036
- Reduction of display artifacts by random sampling p 204 A85-24291
- Colloquium on Control Stations, Cologne, West Germany, October 16, 17, 1984, Reports p 205 A85-25509
- The man in the cockpit of a modern commercial aircraft p 205 A85-25511
- Error management methods in the cockpits of high-performance aircraft p 205 A85-25512
- Boundary conditions of work place design in flight operation p 205 A85-25514
- Oversight in Eurocontrol-Central, Maastricht UAC p 205 A85-25515
- The effects of time delay in man-machine control systems: Implications for design of flight simulator Visual-Display-Delay compensation [AD-P004329] p 205 N85-17983
- Role of engineering psychology p 197 N85-18561
- Problems of psychological support of automated organization control systems p 198 N85-18571
- Health standards for general vibration p 186 N85-19607
- Sector suite man-machine functional capabilities and performance requirements [AD-A148881] p 207 N85-19647
- Man-machine interaction: Operator [AD-A149075] p 207 N85-19648
- Human Factors Considerations in High Performance Aircraft [AGARD-CP-371] p 208 N85-19653
- Military pilot ergonomics p 208 N85-19655
- Grasp of information by the pilot in future combat aircraft p 209 N85-19662
- The cockpit of the year 2000: How big a step? p 210 N85-19667
- The multiple resources model of human performance: Implications for display design p 210 N85-19669
- MANAGEMENT**
- Management training for cockpit crews at Piedmont flight p 197 N85-18013
- Video concepts in CRM training p 197 N85-18015
- Use of simulator scenarios for CRM training p 197 N85-18016
- MANIPULATORS**
- Force feedback in a manipulator control system p 205 A85-25584
- MANNED SPACE FLIGHT**
- Spacesuit development - The American experience p 202 A85-23123
- Suspended animation for space flight p 172 A85-25832
- MANNED SPACECRAFT**
- Approaches to radiation guidelines for space travel [DE85-001248] p 186 N85-18576
- MANUAL CONTROL**
- Adaptivity of the eye-hand system of a human operator p 190 A85-23154
- MARS (PLANET)**
- Life on the terrestrial planets? p 211 A85-25674
- MARS SURFACE**
- Growth of soil bacteria in presence of Martian soil analog, carbon dioxide and hydrogen peroxide p 175 N85-18560
- MASKS**
- Hydrogen-oxygen (hydrox) breathing at 1.3MPa [FOA-C-58015-H1] p 186 N85-18577
- MASS TRANSFER**
- A simulation of the regional deposition of air ions in human lungs p 181 A85-23255
- MATCHING**
- Individual differences in chromatic brightness matching [AD-A148882] p 199 N85-19641

MATHEMATICAL PROGRAMMING

- Methodological problems of man-machine interaction in the solution of mathematical problems p 202 A85-23315

MEASURING INSTRUMENTS

- A method for comparing the simple sensorimotor responses of interacting operators p 202 A85-23166

MECHANORECEPTORS

- The effect of a task on human skin mechanoreceptor response p 192 A85-23284

MEDICAL EQUIPMENT

- The use of acupuncture to correct psychophysiological states in humans p 177 A85-23155

MEDICAL SCIENCE

- USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-USSR-85-007] p 175 N85-18566

- USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-USSR-85-008] p 176 N85-19605

MEMBRANES

- Effect of low-frequency acoustic oscillations and certain erythrocyte membrane components in vitro p 165 A85-23218

- Bioelectrochemistry 2: Membrane phenomena [AD-A149132] p 176 N85-19602

- The effect of inert gases on ion transport across the erythrocyte membrane [AD-A148889] p 189 N85-19635

MEMORY

- Effect of visual features of the stimulus material on the formation of functional units of memory p 191 A85-23245

- Extraction of a complex signal from memory p 193 A85-23288

- The effect of paradoxical sleep deprivation on the learning of the active avoidance reaction p 173 A85-26261

- Problems of psychological support of automated organization control systems p 197 N85-18570

MENTAL PERFORMANCE

- Investigation of the functional state of a human operator during the formation of a mental habit p 191 A85-23161

- The dynamics of reflexive operations in productive thinking activity p 191 A85-23227

- Levels of development of the need for cognition p 191 A85-23228

- The effect of success and failure on the human functional state p 191 A85-23229

- Image of the world and psychological investigation of thinking p 191 A85-23242

- Effect of visual features of the stimulus material on the formation of functional units of memory p 191 A85-23245

- Psychological aspects of the phenomenon of spatial synchronization of potentials p 192 A85-23280

- The principles of experimental setup in models of complex human operator activities p 192 A85-23283

- Probabilistic model of the unconscious - The unconscious as manifestation of a semantic universe p 193 A85-23287

- Extraction of a complex signal from memory p 193 A85-23288

- Redundancy as a principle of the programming activity of the brain p 169 A85-23030

- Spatial localization and projection of sensory images p 193 A85-23314

- The basic properties of the nervous system and their role in occupational activity p 196 A85-26256

- The effect of paradoxical sleep deprivation on the learning of the active avoidance reaction p 173 A85-26261

- Methods of monitoring mental work efficiency, emotional activity p 199 N85-19627

- Improvement of workload estimation techniques in piloting tasks [NASA-CR-174374] p 207 N85-19646

- MERCURY (METAL)**

- Mercury health effects update: Health issue assessment [PB85-123925] p 190 N85-19639

- METABOLISM**

- The photosynthetic apparatus of bacteria as a converter of the energy of light into electrical energy p 170 A85-24650

- Influence of hyperthermia on body temperature and content of catecholamines in white rat hypothalamus p 176 N85-19615

- Skeletal muscle metabolism during exercise is influenced by heat acclimation p 188 N85-19632

- METHYL COMPOUNDS**

- Effect of methylmethacrylate and acrylamide on the microsomal oxidation system in the rat liver p 168 A85-23294

MICROBIOLOGY

- USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-USSR-85-002] p 174 N85-18559

MICROORGANISMS

- Investigation of the dynamics of the automicoflora of the skin and fauces, and the bacterial contamination of the underclothes of mine workers p 202 A85-23273

- Growth of soil bacteria in presence of Martian soil analog, carbon dioxide and hydrogen peroxide p 175 N85-18560

MICROWAVE FREQUENCIES

- The mechanism of variations in erythrocyte electrophoretic mobility in response the UHF irradiation p 167 A85-23254

MIDLATITUDE

- Experimental atherosclerosis in middle-altitude conditions p 165 A85-23201

MILITARY HELICOPTERS

- Aircrew-aircraft integration issues in future US Army helicopters p 210 N85-19672

MINERAL METABOLISM

- The effect of an iron deficient diet on the formation of bone tissue p 168 A85-23275

- The connection between the parameters of sodium and potassium distribution and the contractile properties of muscles p 169 A85-23307

MISSION PLANNING

- Human Factors Considerations in High Performance Aircraft [AGARD-CP-371] p 208 N85-19653

MITOCHONDRIA

- Changes in the composition of mitochondrial lipids in the presence of dinitrophenol under hypoxic conditions p 168 A85-23291

- The role of mitochondria in the regulation of Ca(2+) transmembrane current in myocardial cells p 173 A85-26285

MITOSIS

- The effect of magnetic fields on somatic cell division in plants p 169 A85-23302

MOBILITY

- Determination of functional mobility of human nervous system with the PNN-3 instrument p 187 N85-19618

MODES

- Maximal blood-circulation modes p 183 A85-25648

MODULATION TRANSFER FUNCTION

- Introduction to color vision p 190 A85-22589

- An evaluation of system quality metrics for hard-copy and soft-copy displays of digital imagery p 204 A85-24301

MOLECULAR BIOLOGY

- Structural studies of human IgA1 and IgA2 immunoglobulins tagged with two different spin-labels p 181 A85-23251

- Cell surface RNA - A possible molecular receptor for adaptogens p 166 A85-23252

- Phagocytosis - Physiological and molecular aspects p 167 A85-23267

- Beta-decay, Bremsstrahlen, and the origin of molecular chirality p 211 A85-23869

- Evolutionary constraints and the neutral theory --- mutation-caused nucleotide substitutions in DNA p 170 A85-23870

- New estimates of asymmetric decomposition of racemic mixtures by natural beta-radiation sources p 211 A85-24440

MORPHOLOGY

- Endocrine structure of the kidneys in hypertensive disease p 181 A85-23263

MORTALITY

- Morbidity and mortality associated with exposure to Otto Fuel II in the U.S. Navy 1966-1979 p 185 N85-18574

MOTION AFFECTEFFECTS

- Discontinuity limits for the generation of visual motion aftereffects with sine- and square-wave gratings p 194 A85-24388

MOTION PERCEPTION

- Visual processing of moving stimuli p 193 A85-24383

- Vision in the presence of known natural retinal image motion p 193 A85-24384

- Smooth pursuit of small-amplitude sinusoidal motion p 193 A85-24385

- Sequential recruitment in the discrimination of velocity p 193 A85-24386

- Spatial and temporal parameters of motion detection in the peripheral visual field p 193 A85-24387

- Discontinuity limits for the generation of visual motion aftereffects with sine- and square-wave gratings p 194 A85-24388

- Receptive-field symmetry probed using converging gratings p 194 A85-24389

- Visual responses to vorticity and the neural analysis of optic flow p 194 A85-24390

- Spatiotemporal energy models for the perception of motion p 194 A85-24391
 Elaborated Reichardt detectors p 204 A85-24392
 Model of human visual-motion sensing p 194 A85-24393
- MOTION SICKNESS**
 Simulator sickness: Sensorimotor disturbances induced in flight simulators p 184 N85-17988
 |AD-P004334| Management of vibration sickness in coal mines by hyperbaric oxygenation p 186 N85-19609
 Comparative assessment of different treatment modalities in miners with vibration- and noise-induced disease p 186 N85-19610
 Modulated sinusoidal currents in management of vibration sickness p 187 N85-19612
- MOTION SICKNESS DRUGS**
 Management of microcirculatory disorders in vibration sickness p 186 N85-19611
- MUSCLES**
 Investigation of the dynamics of the automicrflora of the skin and fauces, and the bacterial contamination of the underclothes of mine workers p 202 A85-23273
- MUSCLES**
 The effect of hypodynamia on the hemomicrocirculatory bed in rat triceps brachii muscle and its fascia p 166 A85-23233
 Specific glucocorticoid receptors of human muscle cytosol p 182 A85-23309
 Epinephrine is unessential for stimulation of liver glycogenolysis during exercise p 172 A85-25708
- MUSCULAR FATIGUE**
 The dynamics of an extremely slow omega-potential and EEG spatial synchronization in the presence of muscle fatigue p 183 A85-25646
- MUSCULAR FUNCTION**
 The muscle as a system of parametric excitation p 167 A85-23257
 The connection between the parameters of sodium and potassium distribution and the contractile properties of muscles p 169 A85-23307
 The integration of motor and vegetative functions during muscular work p 183 A85-25645
 Protein metabolism in the muscles following muscular work p 171 A85-25647
 Muscle and femoral vein temperatures during short-term maximal exercise in heart failure p 183 A85-25702
 Muscle contraction and free energy transduction in biological systems p 172 A85-25822
- MUSCULAR STRENGTH**
 Assessment of muscle strength and prediction of lifting capacity in US Army personnel p 189 N85-19633
- MUSCULOSKELETAL SYSTEM**
 Skeletal muscle metabolism during exercise is influenced by heat acclimation p 188 N85-19632
- MYOCARDIAL INFARCTION**
 Drop in nervous-system load as a risk factor in the development of myocardial infarction p 182 A85-25618
 Changes in central hemodynamic parameters under the influence of volume loading in a healthy state, and during experimental myocardial infarction p 173 A85-26258
 Morbidity and mortality associated with exposure to Otto Fuel II in the U.S. Navy 1966-1979 p 185 N85-18574
- MYOCARDIUM**
 Fatty acid metabolism in the myocardium under normal conditions and in cardiac disease (Survey) p 168 A85-23290
 The effect of deficient blood supply in the heart on ATPase systems p 168 A85-23293
 Redox processes in the rat myocardium under acute hypoxia p 172 A85-26251
 An investigation of the isovolumic indices of myocardial contractility in response to directed changes in heart function p 173 A85-26257
 The role of mitochondria in the regulation of Ca(2+) transmembrane current in myocardial cells p 173 A85-26285
- N**
- NASA PROGRAMS**
 Spacesuit development - The American experience p 202 A85-23123
- NAVIGATION**
 Colloquium on Control Stations, Cologne, West Germany, October 16, 17, 1984, Reports p 205 A85-25509
- NAVY**
 Restraint improvement retrofit program - Objectives and requirements p 200 A85-22759
- U.S. Navy aviation mishap aircrew anthropometry - 1 January 1969 through 31 December 1979 p 201 A85-22775
- NECK (ANATOMY)**
 Factors influencing the incidence and severity of 'ejection associated' neck injuries sustained by U.S. Navy ejection 1 January 1969 through 31 December 1979 - A preliminary report p 177 A85-22776
- NERVOUS SYSTEM**
 The effect of success and failure on the human functional state p 191 A85-23229
 Determination of functional mobility of human nervous system with the PNN-3 instrument p 187 N85-19618
 Mercury health effects update: Health issue assessment p 190 N85-19639
 |PB85-123925| Selecting one among the many: A simple network implementing shifts in selective visual attention p 199 N85-19644
- NETWORKS**
 Selecting one among the many: A simple network implementing shifts in selective visual attention |AD-A148989| p 199 N85-19644
- NEUROLOGY**
 Neurochemical mechanisms for the regulation of pain sensitivity p 173 A85-26286
 The physical basis for the generation of neuromagnetic fields p 174 A85-26298
 Multiple resources and brain laterality |AD-A148912| p 199 N85-19643
- NEUROPHYSIOLOGY**
 Configurational generators of neural rhythm p 167 A85-23259
 An investigation of the psychological aspects of individual manifestations of sociability in humans p 192 A85-23281
 Visual responses to vorticity and the neural analysis of optic flow p 194 A85-24390
 General features of sensory processes under the effects of extreme stimuli p 171 A85-25644
 Neural dynamics of brightness perception - Features, boundaries, diffusion, and resonance p 195 A85-25789
 Spatial contrast detection for colour patterns under selective chromatic adaptation p 195 A85-25815
 Methodological aspects of the problem of neurohumoral regulation and their implications for the cognition of pain mechanisms p 173 A85-26255
 The physiological role of adrenergic elements of the hypothalamus in the regulation of hypothalamo-adenohypophyseal systems of adaptation p 174 A85-26288
 The physical basis for the generation of neuromagnetic fields p 174 A85-26298
 Effects of partial deprivation of slow-wave sleep on sleep-wakefulness cycles p 187 N85-19613
- NEUROSES**
 The use of acupuncture to correct psychophysiological states in humans p 177 A85-23155
- NEUROTRANSMITTERS**
 Methodological aspects of the problem of neurohumoral regulation and their implications for the cognition of pain mechanisms p 173 A85-26255
- NIGHT**
 The hemodynamics of various stages of nighttime sleep in patients with preliminary symptoms of cerebral hemodynamic deficiency p 180 A85-23248
- NIGHT VISION**
 Effect of extreme peripheral light on dark adaptation |AD-A148923| p 189 N85-19636
 The relative effectiveness of red and white light for subsequent dark-adaptation |AD-A148883| p 199 N85-19642
- NITRATE ESTERS**
 Morbidity and mortality associated with exposure to Otto Fuel II in the U.S. Navy 1966-1979 p 185 N85-18574
- NOISE (SOUND)**
 Effects of overall vibration and noise on operational personnel p 207 N85-19608
- NOISE INJURIES**
 A comparative evaluation of various methods for the treatment of miners with vibration-induced and noise-induced pathologies p 179 A85-23207
 An investigation of the cerebral hemodynamics of workers exposed to industrial noise p 181 A85-23265
- NOISE INTENSITY**
 A mechanism for the effect of noise on the labyrinth p 165 A85-23209
 Dose assessment of noise load on tractor operators in agriculture p 179 A85-23210
 Effect of total-body vibration and noise on the functional state of human operators p 179 A85-23211
- NOISE POLLUTION**
 Assessment of functional reserves of an operator in a state of fatigue p 178 A85-23158
- NOISE REDUCTION**
 Noise protection of workers in the sawmill and wood-processing industry p 179 A85-23216
- NOISE TOLERANCE**
 Dose assessment of noise load on tractor operators in agriculture p 179 A85-23210
- NORADRENALINE**
 An analysis of the regulation of noradrenaline secretion by autoadreno-receptors and frequency stimulation p 167 A85-23258
- NUCLEOTIDES**
 Evolutionary constraints and the neutral theory --- mutation-caused nucleotide substitutions in DNA p 170 A85-23870
- NUMERICAL CONTROL**
 The F-18: A new era for human factors p 210 N85-19671
- NUTRITIONAL REQUIREMENTS**
 Carbohydrate metabolism and acid-base equilibrium in relation to nutrition in persons performing physical and mental work in the Estonian SSR p 181 A85-23274
- O**
- OBLIQUENESS**
 Meridional anisotropy of spatial displacement detection p 195 A85-25791
- OCCUPATION**
 An investigation of the cerebral hemodynamics of workers exposed to industrial noise p 181 A85-23265
 The basic properties of the nervous system and their role in occupational activity p 196 A85-26256
 Success in learning occupation of chemical production technician as function of certain personality traits and development of psychophysiological functions p 206 N85-18568
- OCEANS**
 Mercury health effects update: Health issue assessment |PB85-123925| p 190 N85-19639
- OCULOMETERS**
 Application of active oculography and electroneuromyography to analyze the effect of drugs p 178 A85-23165
 Generation-V dual-Purkinje-image eyetracker p 204 A85-25089
- ONBOARD EQUIPMENT**
 Dynamic training devices in CRM training p 197 N85-18018
 Use of airplanes for loft training p 197 N85-18019
- OPERATOR PERFORMANCE**
 Methodology and techniques of psychophysiological studies of operator activity p 177 A85-23151
 Effect of daily routine on the functional state of operators according to heart-rhythm parameters p 177 A85-23153
 Adaptivity of the eye-hand system of a human operator p 190 A85-23154
 The use of acupuncture to correct psychophysiological states in humans p 177 A85-23155
 A method for controlling the state of an operator in conditions of complex activity p 190 A85-23156
 Psychophysiological methods for the assessment of the state of a human operator during the controlled effect of ethanol p 178 A85-23157
 Assessment of functional reserves of an operator in a state of fatigue p 178 A85-23158
 Rapid monitoring and prediction of the psychophysiological state of an operator during the simulation of emergency situations p 190 A85-23159
 Slow negative potentials and probabilistic prediction --- for operator performance evaluation p 178 A85-23160
 Investigation of the functional state of a human operator during the formation of a mental habit p 191 A85-23161
 Algorithm for the computer identification and processing of the psychophysiological parameters of human operators in a tracking process p 202 A85-23162
 Development of a complex of programs of spectral EEG analysis for the operational diagnostics of the functional state of human operators p 178 A85-23163
 The stress index as an index of the work state of an operator p 178 A85-23164
 A method for comparing the simple sensorimotor responses of interacting operators p 202 A85-23166
 Dose assessment of noise load on tractor operators in agriculture p 179 A85-23210
 Effect of total-body vibration and noise on the functional state of human operators p 179 A85-23211
 Noise protection of workers in the sawmill and wood-processing industry p 179 A85-23216
 Physiological characterization of the work of the operating personnel of a power system in an arid zone p 179 A85-23219

SUBJECT INDEX

- A method for studying work activities --- of air navigator p 191 A85-23231
- Functional work load on an operator for various regimes of the movement of closed eyes p 191 A85-23244
- Effect of visual features of the stimulus material on the formation of functional units of memory p 191 A85-23245
- Some methodological approaches to predicting the functional state of the body associated with hazardous environmental factors p 167 A85-23268
- Experience with the early diagnosis and prevention of the vibration sickness of construction workers p 181 A85-23271
- Investigation of the dynamics of the automicroflora of the skin and fauces, and the bacterial contamination of the underclothes of mine workers p 202 A85-23273
- Some perspectives on the study and improvement of the cognitive-creative activity of an individual and a group p 191 A85-23276
- The principles of experimental setup in models of complex human operator activities p 192 A85-23283
- Interrelationship between learning and development in the process of mastering an occupational activity p 192 A85-23285
- Automation of an investigation procedure using a 16-factor personality questionnaire p 192 A85-23286
- Organization and efficiency of a team-basis method for the prophylactic ultraviolet irradiation of coal miners p 182 A85-23300
- Estimation of the efficiency of two-goal differential-game ergotic control systems p 203 A85-24031
- Assessment of the work capacity of ergotic systems p 203 A85-24032
- Certain problems in the automated assessment of the operating efficiency of man-machine systems p 203 A85-24035
- Simulation model for assessing the combined effect of engineering and psychological factors on the efficiency of a man-machine system p 203 A85-24036
- Work physiology of operating personnel at power plants in arid regions p 207 N85-19606
- OPERATORS (PERSONNEL)**
- Work capacity of heat and electric power plant operations working 12 hour day and night shifts p 206 N85-18567
- Study of bodily functional status and quality of controlling action of power unit operators with various intensities of labor p 206 N85-18569
- Man-machine interaction: Operator IAD-A149075 p 207 N85-19648
- OPHTHALMOLOGY**
- The state of the sanguiferous bed of the vascular tunic of the eyeball and retrobulbar formations in association with experimental vascular congestion p 166 A85-23237
- OPTICAL ACTIVITY**
- Beta-decay, Bremsstrahlen, and the origin of molecular chirality p 211 A85-23869
- OPTICAL ILLUSION**
- A mathematical model of visual perception regarding peripheral vision and its application to the Hermann's illusion p 195 A85-25199
- OPTICAL MEASUREMENT**
- An optical study of electromechanical coupling in heart fibers p 167 A85-23256
- OPTICAL TRACKING**
- Adaptivity of the eye-hand system of a human operator p 190 A85-23154
- Interaction between saccade and tracking vergence p 194 A85-24501
- OPTOMETRY**
- Laser optometric assessment of visual display visibility p 200 A85-22590
- An analysis of light and technical parameters for visual acuity measurement devices and some methods for their standardization p 202 A85-23304
- ORIENTATION**
- Colloquium on Control Stations, Cologne, West Germany, October 16, 17, 1984, Reports p 205 A85-25509
- OTOLOGY**
- A mechanism for the effect of noise on the labyrinth p 165 A85-23209
- OXIDATION-REDUCTION REACTIONS**
- Redox processes in the rat myocardium under acute hypoxia p 172 A85-26251
- Changes in redox processes in rats with anemia due to alkylating preparations in alpine climatic conditions p 172 A85-26253
- OXYGEN**
- Blood viscosity responses to acute exercise and aerobic conditioning in women p 185 N85-18573
- Hydrogen-oxygen (hydrox) breathing at 1.3MPa |FOA-C-58015-H1| p 186 N85-18577

- Artificial photosynthesis with algal and reconstituted systems |DE85-002557| p 176 N85-19604
- OXYGEN METABOLISM**
- Respiratory chain of alkalophilic bacteria |DE84-012558| p 174 N85-18556
- OXYGENATION**
- Experimental atherosclerosis in middle-altitude conditions p 165 A85-23201
- A comparative evaluation of various methods for the treatment of miners with vibration-induced and noise-induced pathologies p 179 A85-23207
- Treatment of vibration sickness in coal miners by means of hyperbaric oxygenation p 179 A85-23213
- Effect of methylmethacrylate and acrylamide on the microsomal oxidation system in the rat liver p 168 A85-23294
- Change in the response of the heart to posthypoxic reoxygenation after injection of superoxide dismutase and its inhibitor p 171 A85-25617
- Management of vibration sickness in coal mines by hyperbaric oxygenation p 186 N85-19609
- OZONE**
- Health assessment document for carbon tetrachloride |PB85-124196| p 190 N85-19638
- P**
- PAIN SENSITIVITY**
- Methodological aspects of the problem of neurohumoral regulation and their implications for the cognition of pain mechanisms p 173 A85-26255
- Neurochemical mechanisms for the regulation of pain sensitivity p 173 A85-26286
- PALEOBIOLOGY**
- Precambrian fossils and the origins of biologic organization p 211 A85-25667
- PANORAMIC SCANNING**
- Panoramic vision and its applications p 192 A85-23277
- PARASITIC DISEASES**
- Computer tomography of alveococcosis in the liver p 180 A85-23222
- PATHOGENESIS**
- The syncopal state associated with moderate craniocerebral trauma p 179 A85-23220
- Drop in nervous-system load as a risk factor in the development of myocardial infarction p 182 A85-25618
- PATHOLOGICAL EFFECTS**
- Hematological complications of drug therapy p 180 A85-23223
- Some methodological approaches to predicting the functional state of the body associated with hazardous environmental factors p 167 A85-23268
- PATTERN RECOGNITION**
- Neurocognitive pattern analysis of an auditory and visual numeric motor control task. Part 1: Development of methods |AD-A148809| p 198 N85-18578
- PEPTIDES**
- Angiotensin II. - Induced hypothermia in rats p 171 A85-25707
- PERCEPTION**
- Military pilot ergonomics p 208 N85-19655
- Grasp of information by the pilot in future combat aircraft p 209 N85-19662
- PERCEPTUAL ERRORS**
- Tilt from a head-inverted position produces displacement of visual subjective vertical in the opposite direction p 195 A85-25790
- Meridional anisotropy of spatial displacement detection p 195 A85-25791
- PERCEPTUAL TIME CONSTANT**
- A model of a constant color perception pattern for the case of continuous spectral functions p 184 A85-26296
- PERFORMANCE TESTS**
- Human performance evaluations of digital image quality p 200 A85-22592
- PERIPHERAL CIRCULATION**
- Effect of an elevated level of natural radioactivity on glycogen content in peripheral-blood leukocytes of *Microtus oeconomus Pall* p 170 A85-24027
- PERIPHERAL VISION**
- Spatial and temporal parameters of motion detection in the peripheral visual field p 193 A85-24387
- Loss of spatial phase relationships in extrafoveal vision p 194 A85-24433
- A mathematical model of visual perception regarding peripheral vision and its application to the Hermann's illusion p 195 A85-25199
- Spatial contrast detection for colour patterns under selective chromatic adaptation p 195 A85-25815

PHYSICAL WORK

PERSONALITY

- Psychological aspects of the phenomenon of spatial synchronization of potentials p 192 A85-23280
- Interrelationship between learning and development in the process of mastering an occupational activity p 192 A85-23285
- Success in learning occupation of chemical production technician as function of certain personality traits and development of psychophysiological functions p 206 N85-18568

PERSONALITY TESTS

- Automation of an investigation procedure using a 16-factor personality questionnaire p 192 A85-23286

PERSONNEL

- Success in learning occupation of chemical production technician as function of certain personality traits and development of psychophysiological functions p 206 N85-18568

PERSONNEL DEVELOPMENT

- Interrelationship between learning and development in the process of mastering an occupational activity p 192 A85-23285

PERSONNEL MANAGEMENT

- Communications skills for CRM training p 197 N85-18017

PERTURBATION THEORY

- Effect of random perturbations on the controllability domain in ergotic dynamic systems p 203 A85-24030

PETROLOGY

- Ammonium contents of biotites from Precambrian rocks in Finland - The significance of NH4(+) as a possible chemical fossil p 212 A85-25839

PH FACTOR

- Respiratory chain of alkalophilic bacteria |DE84-012558| p 174 N85-18556

PHARMACOLOGY

- The pharmacological correction of fatigue --- Russian book p 169 A85-23725

- Tyrosine administration enhances dopamine synthesis and release in light-activated rat retina p 170 A85-24500

- Angiotensin II. - Induced hypothermia in rats p 171 A85-25707

PHASE DEVIATION

- Loss of spatial phase relationships in extrafoveal vision p 194 A85-24433

PHILOSOPHY

- Spatial localization and projection of sensory images p 193 A85-23314

PHOTOELECTRICITY

- The photosynthetic apparatus of bacteria as a converter of the energy of light into electrical energy p 170 A85-24650

PHOTOINTERPRETATION

- An evaluation of system quality metrics for hard-copy and soft-copy displays of digital imagery p 204 A85-24301

PHOTOMETRY

- Individual differences in chromatic brightness matching |AD-A148882| p 199 N85-19641

PHOTOSYNTHESIS

- The photosynthetic apparatus of bacteria as a converter of the energy of light into electrical energy p 170 A85-24650

PHYSICAL EXERCISE

- Mechanism for the increase of arterial pressure in a state of rest and during physical exercise in patients with hypertension p 182 A85-23312

- Maximal blood-circulation modes p 183 A85-25648

- Chronic exercise and left ventricular structure and function in healthy human subjects p 184 A85-25703

- Central control of cardiovascular adjustments to exercise p 184 A85-25704

- Effects of exercise training on coronary transport capacity p 171 A85-25705

PHYSICAL FITNESS

- Assessment of muscle strength and prediction of lifting capacity in US Army personnel p 189 N85-19633

PHYSICAL WORK

- The pharmacological correction of fatigue --- Russian book p 169 A85-23725

- The integration of motor and vegetative functions during muscular work p 183 A85-25645

- Protein metabolism in the muscles following muscular work p 171 A85-25647

- An estimate of the efficiency of intrapulmonary gas exchange during muscular work in hypoxic conditions p 184 A85-26259

PHYSIOCHEMISTRY

Status of the kallikrein-kinin system in blood from the cardiac ventricles in the development dynamics of spontaneous hypertension in rats p 169 N85-23298

Methodological aspects of the problem of neurohumoral regulation and their implications for the cognition of pain mechanisms p 173 N85-26255

Neurochemical mechanisms for the regulation of pain sensitivity p 173 N85-26286

The physiological role of adrenergic elements of the hypothalamus in the regulation of hypothalamo-adenohypophyseal systems of adaptation p 174 N85-26288

PHYSIOLOGICAL DEFENSES

Protein synthesis and DNA replication in lymphocytes in an immune response p 167 N85-23266

PHYSIOLOGICAL EFFECTS

Effect of daily routine on the functional state of operators according to heart-rhythm parameters p 177 N85-23153

Psychophysiological methods for the assessment of the state of a human operator during the controlled effect of ethanol p 178 N85-23157

Application of active oculography and electromyography to analyze the effect of drugs p 178 N85-23165

Effect of decimeter-range waves on the aggregation activity of thrombocytes, given different localizations of effects in victims of cerebral insult p 178 N85-23204

A mechanism for the effect of noise on the labyrinth p 165 N85-23209

Effect of total-body vibration and noise on the functional state of human operators p 179 N85-23211

The morphological basis of a 'minimization function' for the nephron epithelium during uniform hyperthermia p 169 N85-23301

Effect of decimeter waves on the relative content of T-lymphocytes in the lymphoid organs p 169 N85-23313

Effect of an elevated level of natural radioactivity on glycogen content in peripheral-blood leukocytes of *Microtus oeconomus* Pall p 170 N85-24027

Contradictory results in interferon research p 170 N85-24499

Prevention measures for the adverse effects of vibration --- on flight personnel p 183 N85-25620

Effects of exercise training on coronary transport capacity p 171 N85-25705

Gravity and biological systems: Emphasis on human physiology |ESA-BR-21| p 174 N85-18558

Effect of modulated ultrahigh frequency field on behavior and hormone level in female rats under emotional stress p 175 N85-18562

Study of bodily functional status and quality of controlling action of power unit operators with various intensities of labor p 206 N85-18569

Genetic effects of microwave exposure on mammalian cells *in vitro*, volume 2 |AD-A149347| p 176 N85-19603

Work physiology of operating personnel at power plants in arid regions p 207 N85-19606

Effects of overall vibration and noise on operational personnel p 207 N85-19608

Management of vibration sickness in coal mines by hyperbaric oxygenation p 186 N85-19609

Influence of hyperthermia on body temperature and content of catecholamines in white rat hypothalamus p 176 N85-19615

Aircraft noise effects: An interdisciplinary study of the effects of aircraft noise on man: Part 1: Basic report |NASA-TM-75819| p 188 N85-19629

Aircraft noise effects: An interdisciplinary study of the effect of aircraft noise on man. Part 2: Appendix |NASA-TM-75818| p 188 N85-19630

Aircraft noise effects: An interdisciplinary study of the effect of aircraft noise on man. Part 3: Supplementary analyses of the social-scientific portion of the study on aircraft noise conducted by the DFG |NASA-TM-75802| p 188 N85-19631

Health assessment document for carbon tetrachloride |PB85-124196| p 190 N85-19638

Mercury health effects update: Health issue assessment |PB85-123925| p 190 N85-19639

Heat stress and personal protective equipment |DE85-003552| p 208 N85-19652

Observations of physiological and psychological effects of terrain following flight based on in-flight test experience p 209 N85-19657

Tolerance, fatigue, physiological and performance effects of sustained and oscillating lateral accelerations p 190 N85-19659

PHYSIOLOGICAL RESPONSES

Slow negative potentials and probabilistic prediction --- for operator performance evaluation p 178 N85-23160

Effect of a low-frequency alternating magnetic field on the course of pyrogenic fever p 165 N85-23202

Responses of people to heat load in saunas p 178 N85-23203

The use of enzymes to correct the immune response under vibration loading p 165 N85-23215

Physiological characterization of the work of the operating personnel of a power system in an arid zone p 179 N85-23219

Certain conclusions and prospects of study pertaining to the vascular system in the case of limitations on motor activity p 166 N85-23232

The structure of the renal artery wall during restricted motor activity p 166 N85-23234

Some methodological approaches to predicting the functional state of the body associated with hazardous environmental factors p 167 N85-23268

The effect of a task on human skin mechanoreceptor response p 192 N85-23284

Visual processing of moving stimuli p 193 N85-24383

Visual responses to vorticity and the neural analysis of optic flow p 194 N85-24390

Spatiotemporal energy models for the perception of motion p 194 N85-24391

Elaborated Reichardt detectors p 204 N85-24392

Effect of cutaneous denervation of face and trunk on thermoregulatory responses to cold in rats p 171 N85-25701

Central control of cardiovascular adjustments to exercise p 184 N85-25704

Angiotensin II. - Induced hypothermia in rats p 171 N85-25707

The physiology of ultradian rhythms and their role in affecting disease resistance |AD-A148842| p 185 N85-18575

Hemodynamics responses to upright tilt at sea level and high altitude |AD-A148848| p 189 N85-19634

Multiple resources and brain laterality |AD-A148912| p 199 N85-19643

PHYSIOLOGICAL TESTS

Variability of cardiac rhythm during information loading p 187 N85-19619

PHYSIOLOGY

USSR report: Life sciences. Biomedical and behavioral sciences |JPRS-UBB-85-008| p 176 N85-19605

PILOT ERROR

Error management methods in the cockpits of high-performance aircraft p 205 N85-25512

PILOT PERFORMANCE

A computer model for prediction of pilot performance based on the addition of different weights at various locations on the head p 201 N85-22772

Effect of random perturbations on the controllability domain in ergodic dynamic systems p 203 N85-24030

A methodology for determining the parameters of a pilot as an information-processing control system p 203 N85-24033

Simulation of pilot activity on the basis of onboard-recorder data p 203 N85-24034

The man in the cockpit of a modern commercial aircraft p 205 N85-25511

Prevention measures for the adverse effects of vibration --- on flight personnel p 183 N85-25620

Improvement of workload estimation techniques in piloting tasks |NASA-CR-174374| p 207 N85-19646

Tolerance, fatigue, physiological and performance effects of sustained and oscillating lateral accelerations p 190 N85-19659

Impact of future aircombat characteristics on pilot performance and cockpit design p 209 N85-19661

Conceptual model of critical requirements for effective pilot performance in high performance aircraft p 209 N85-19663

The cockpit of the year 2000: How big a step? p 210 N85-19667

Pilot workload, performance and aircraft control automation p 210 N85-19670

PILOT TRAINING

Some principles for the construction of an adaptive training system p 192 N85-23279

Optimization of pilot-retraining programs with allowance for the individual qualities of the pilots p 204 N85-24038

Tactical fighter aircraft training |SAE PAPER 841587| p 196 N85-25985

United States Air Force undergraduate pilot training today and tomorrow |SAE PAPER 841589| p 196 N85-25987

Flight crew training technology: A review

p 196 N85-18010

Low-cost training technology p 196 N85-18011

Captain development training at US Air p 196 N85-18012

Management training for cockpit crews at Piedmont flight p 197 N85-18013

Use of simplifier scenarios for CRM training p 197 N85-18016

PILOTS (PERSONNEL)

Simulator sickness: Sensorimotor disturbances induced in flight simulators |AD-P004334| p 184 N85-17988

Communications skills for CRM training p 197 N85-18017

Innovative approaches to recurrent training p 197 N85-18028

Medically disqualified airline pilots p 197 N85-18028

|AD-A149454| p 189 N85-19637

Crewstation assessment of reach as applied to the OH-58A helicopter |AD-A149413| p 208 N85-19650

Military pilot ergonomics p 208 N85-19655

PITCH (INCLINATION)

Some effects of display format variables on the perception of aircraft spatial orientation p 210 N85-19666

PITUITARY GLAND

The effect of long-term stress on the hypophyseal-adrenal-gonad systems in rabbits of various ages p 172 N85-26254

PLAN POSITION INDICATORS

Influence of a perspective cockpit traffic display format on pilot avoidance maneuvers p 210 N85-19668

PLANTS (BOTANY)

Activation and localization of transport ATPase in cells of pea-seedling roots in hypogravity conditions p 169 N85-23305

Energy transfer in plants in weightlessness p 170 N85-24193

POSTFLIGHT ANALYSIS

Simulation of pilot activity on the basis of onboard-recorder data p 203 N85-24034

POTABLE WATER

Closed-loop concepts for the Army: Water conservation, recycle, and reuse |AD-A148839| p 207 N85-18581

POTASSIUM

The connection between the parameters of sodium and potassium distribution and the contractile properties of muscles p 169 N85-23307

PRECAMBRIAN PERIOD

Precambrian fossils and the origins of biologic organization p 211 N85-25667

Ammonium contents of biotites from Precambrian rocks in Finland - The significance of NH4(+) as a possible chemical fossil p 212 N85-25839

PREDICTION ANALYSIS TECHNIQUES

Assessment of muscle strength and prediction of lifting capacity in US Army personnel |AD-A148846| p 189 N85-19633

PRESSURE SUITS

Influence of G-suit abdominal bladder inflation on gas exchange during +Gz stress p 171 N85-25706

Servo operated anti-G suit pressurization system |AD-D011468| p 208 N85-19651

Analysis of the transient response of temporal artery blood flow data relative to various anti-G suit pressure schedules p 190 N85-19660

PRIMITIVE EARTH ATMOSPHERE

Abiotic synthesis of purines and other heterocyclic compounds by the action of electrical discharges p 211 N85-23868

PROBABILITY THEORY

Slow negative potentials and probabilistic prediction --- for operator performance evaluation p 178 N85-23160

Probabilistic model of the unconscious - The unconscious as manifestation of a semantic universe p 193 N85-23287

PROBLEM SOLVING

Methodological problems of man-machine interaction in the solution of mathematical problems p 202 N85-23315

PRODUCTION ENGINEERING

Role of engineering psychology p 197 N85-18561

PROGNOSIS

The evaluation of summary vibration load and some biomedical factors in determining the risk of vibration-induced illness in miners p 179 N85-23206

PROPHYLAXIS

The correction of microcirculatory disorders from vibration illness p 179 N85-23208

Experience with the early diagnosis and prevention of the vibration sickness of construction workers p 181 N85-23271

SUBJECT INDEX

- Organization and efficiency of a team-basis method for the prophylactic ultraviolet irradiation of coal miners p 182 A85-23300
- Drop in nervous-system load as a risk factor in the development of myocardial infarction p 182 A85-25618
- Prevention measures for the adverse effects of vibration --- on flight personnel p 183 A85-25620
- PROTECTIVE CLOTHING**
- Life Support System Program Office - 1983 corporate report p 201 A85-22761
- Improving head crash protection p 201 A85-22770
- Immersion suits, past and present p 201 A85-22771
- A computer model for prediction of pilot performance based on the addition of different weights at various locations on the head p 201 A85-22772
- A systems analysis of alternative concepts for aircrew cold weather clothing
- |AD-A148805| p 206 N85-18580
- Heat stress and personal protective equipment
- |DE85-003552| p 208 N85-19652
- PROTEIN METABOLISM**
- Protein synthesis and DNA replication in lymphocytes in an immune response p 167 A85-23266
- Free amino acids in the brains of some vertebrates p 169 A85-23308
- Protein metabolism in the muscles following muscular work p 171 A85-25647
- PROTEIN SYNTHESIS**
- Cell surface RNA - A possible molecular receptor for adaptogens p 166 A85-23252
- PROTOBIOLOGY**
- New estimates of asymmetric decomposition of racemic mixtures by natural beta-radiation sources p 211 A85-24440
- PROTOPLASM**
- Effect of methylmethacrylate and acrylamide on the microsomal oxidation system in the rat liver p 168 A85-23294
- PSYCHOACOUSTICS**
- Aircraft noise effects: An interdisciplinary study of the effect of aircraft noise on man. Part 2: Appendix |NASA-TM-75818| p 188 N85-19630
- PSYCHOLINGUISTICS**
- Panoramic vision and its applications p 192 A85-23277
- PSYCHOLOGICAL EFFECTS**
- Psychophysiological methods for the assessment of the state of a human operator during the controlled effect of ethanol p 178 A85-23157
- Aircraft noise effects: An interdisciplinary study of the effects of aircraft noise on man. Part 1: Basic report |NASA-TM-75819| p 188 N85-19629
- Aircraft noise effects: An interdisciplinary study of the effect of aircraft noise on man. Part 2: Appendix |NASA-TM-75818| p 188 N85-19630
- Aircraft noise effects: An inter-disciplinary study of the effect of aircraft noise on man. Part 3: Supplementary analyses of the social-scientific portion of the study on aircraft noise conducted by the DFG |NASA-TM-75802| p 188 N85-19631
- Observations of physiological and psychological effects of terrain following flight based on in-flight test experience p 209 N85-19657
- PSYCHOLOGICAL FACTORS**
- Levels of development of the need for cognition p 191 A85-23228
- The effect of success and failure on the human functional state p 191 A85-23229
- Image of the world and psychological investigation of thinking p 191 A85-23242
- The principles of experimental setup in models of complex human operator activities p 192 A85-23283
- Simulation model for assessing the combined effect of engineering and psychological factors on the efficiency of a man-machine system p 203 A85-24036
- Optimization of pilot-retraining programs with allowance for the individual qualities of the pilots p 204 A85-24038
- Captain development training at US Air p 196 N85-18012
- Management training for cockpit crews at Piedmont flight p 197 N85-18013
- Determination of functional mobility of human nervous system with the PNN-3 instrument p 187 N85-19618
- Research opportunities in human behavior and performance |NASA-CR-175473| p 199 N85-19640
- PSYCHOLOGICAL SETS**
- Redundancy as a principle of the programming activity of the brain p 169 A85-23303
- PSYCHOLOGICAL TESTS**
- A complex method for evaluating the color vision of patients with localized cerebral lesions p 180 A85-23230

RADIOBIOLOGY

- Effect of intragroup favoritism in laboratory and natural conditions p 191 A85-23243
- Automation of an investigation procedure using a 16-factor personality questionnaire p 192 A85-23286
- Probabilistic model of the unconscious - The unconscious as manifestation of a semantic universe p 193 A85-23287
- Restructuring of the process of visual recognition as perception conditions alter p 199 N85-19624
- PSYCHOLOGY**
- Activity, act, and the psychic as a process p 191 A85-23226
- The complex study of man - The place of psychology p 191 A85-23250
- Spatial localization and projection of sensory images p 193 A85-23314
- PSYCHOMETRICS**
- Improvement of workload estimation techniques in piloting tasks |NASA-CR-174374| p 207 N85-19646
- PSYCHOMOTOR PERFORMANCE**
- Panoramic vision and its applications p 192 A85-23277
- Determination of functional mobility of human nervous system with the PNN-3 instrument p 187 N85-19618
- Restructuring of the process of visual recognition as perception conditions alter p 199 N85-19624
- Multiple resources and brain laterality |AD-A148912| p 199 N85-19643
- PSYCHOPHYSIOLOGY**
- The use of acupuncture to correct psychophysiological states in humans p 177 A85-23155
- Psychophysiological methods for the assessment of the state of a human operator during the controlled effect of ethanol p 178 A85-23157
- Rapid monitoring and prediction of the psychophysiological state of an operator during the simulation of emergency situations p 190 A85-23159
- Investigation of the functional state of a human operator during the formation of a mental habit p 191 A85-23161
- Algorithm for the computer identification and processing of the psychophysiological parameters of human operators in a tracking process p 202 A85-23162
- Development of a complex of programs of spectral EEG analysis for the operational diagnostics of the functional state of human operators p 178 A85-23163
- The stress index as an index of the work state of an operator p 178 A85-23164
- Application of active oculography and electromyography to analyze the effect of drugs p 178 A85-23165
- A method for comparing the simple sensorimotor responses of interacting operators p 202 A85-23166
- Effect of total-body vibration and noise on the functional state of human operators p 179 A85-23211
- Objective evaluation of vegetovascular dystonia and psychoemotional disturbances in patients with vibration sickness p 179 A85-23214
- The dynamics of reflexive operations in productive thinking activity p 191 A85-23227
- Functional work load on an operator for various regimes of the movement of closed eyes p 191 A85-23244
- Efficiency of the Eleutherococcus treatment of enuresis p 181 A85-23261
- Psychological aspects of the phenomenon of spatial synchronization of potentials p 192 A85-23280
- An investigation of the psychological aspects of individual manifestations of sociability in humans p 192 A85-23281
- The effect of a task on human skin mechanoreceptor response p 192 A85-23284
- The basic properties of the nervous system and their role in occupational activity p 196 A85-26256
- Simulator sickness: Sensorimotor disturbances induced in flight simulators |AD-P004334| p 184 N85-17988
- Success in learning occupation of chemical production technician as function of certain personality traits and development of psychophysiological functions p 206 N85-18568
- USSR report: Life sciences. Biomedical and behavioral sciences |JPRS-UBB-85-011| p 177 N85-19616
- Electrosleep therapy advanced at medical institute p 188 N85-19623
- Methods of monitoring mental work efficiency, emotional activity p 199 N85-19627
- PSYCHOSOMATICS**
- The use of acupuncture to correct psychophysiological states in humans p 177 A85-23155
- PUBLIC HEALTH**
- Hygienic standardization of whole-body vibration p 178 A85-23205
- Hygienic standards for electromagnetic radiation in the home p 168 A85-23269
- Experience with a centralized provision for individual radiation-dose monitoring p 202 A85-23270
- Mercury health effects update: Health issue assessment |PB85-123925| p 190 N85-19639
- PULMONARY FUNCTIONS**
- A simulation of the regional deposition of air ions in human lungs p 181 A85-23255
- An estimate of the efficiency of intrapulmonary gas exchange during muscular work in hypoxic conditions p 184 A85-26259
- PURSUIT TRACKING**
- Smooth pursuit of small-amplitude sinusoidal motion p 193 A85-24385
- Q**
- QUANTUM MECHANICS**
- Quantum noise and the threshold of hearing p 170 A85-25043
- R**
- RADIATION DOSAGE**
- Radiation doses and biological effects of cosmic rays p 165 A85-22853
- Experience with a centralized provision for individual radiation-dose monitoring p 202 A85-23270
- Effect of lethal and superlethal doses of gamma radiation on the activity of lysosomal enzymes in radio-sensitive and radio-resistant rat tissues p 168 A85-23297
- Approaches to radiation guidelines for space travel |DE85-001248| p 186 N85-18576
- RADIATION EFFECTS**
- Radiation doses and biological effects of cosmic rays p 165 A85-22853
- The mechanism of variations in erythrocyte electrophoretic mobility in response to the UHF irradiation p 167 A85-23254
- Effect of decimeter waves on the relative content of T-lymphocytes in the lymphoid organs p 169 A85-23313
- Effect of modulated ultrahigh frequency field on behavior and hormone level in female rats under emotional stress p 175 N85-18562
- Methodical approaches to determination of sanitation protective zone dimensions around TV centers and TV retransmitters p 185 N85-18563
- Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 1: Expression of ABO and Rhesus system antigen p 175 N85-18564
- Genetic effects of microwave exposure on mammalian cells in vitro. Volume 2, Appendix A: Cytogenetics and growth kinetics data, 850 MHz |AD-A148866| p 175 N85-19599
- Genetic effects of microwave exposure on mammalian cells in vitro. Volume 2, Appendix B: Cytogenetics and growth kinetics data, 1.2 GHz |AD-A148867| p 176 N85-19600
- Genetic effects of microwave exposure on mammalian cells in vitro, volume 2 |AD-A149347| p 176 N85-19603
- RADIATION HAZARDS**
- Hygienic standards for electromagnetic radiation in the home p 168 A85-23269
- An overview of medical-biological radiation hazards in earth orbits |IAF PAPER 83-256| p 203 A85-23811
- Approaches to radiation guidelines for space travel |DE85-001248| p 186 N85-18576
- RADIATION SICKNESS**
- Change in ornithine carbamoyltransferase activity in rats after X-ray irradiation and the administration of a vitamin-coenzyme complex p 170 A85-24026
- RADIO FREQUENCIES**
- Genetic effects of microwave exposure on mammalian cells in vitro. Volume 2, Appendix A: Cytogenetics and growth kinetics data, 850 MHz |AD-A148866| p 175 N85-19599
- Genetic effects of microwave exposure on mammalian cells in vitro, volume 2 |AD-A149347| p 176 N85-19603
- RADIOACTIVE DECAY**
- Beta-decay, Bremsstrahlung, and the origin of molecular chirality p 211 A85-23869
- RADIOBIOLOGY**
- Radiation doses and biological effects of cosmic rays p 165 A85-22853
- The mechanism of variations in erythrocyte electrophoretic mobility in response to the UHF irradiation p 167 A85-23254
- Hygienic standards for electromagnetic radiation in the home p 168 A85-23269

- An overview of medical-biological radiation hazards in earth orbits
[IAF PAPER 83-256] p 203 N85-23811
- Change in ornithine carbamoyltransferase activity in rats after X-ray irradiation and the administration of a vitamin-coenzyme complex p 170 A85-24026
- Effect of an elevated level of natural radioactivity on glycogen content in peripheral-blood leukocytes of *Microtus oeconomus* Pall p 170 A85-24027
- Radiation physics, biophysics, and radiation biology [DE84-014885] p 174 N85-18557
- Effect of modulated ultrahigh frequency field on behavior and hormone level in female rats under emotional stress p 175 N85-18562
- RADIOLOGY**
- Radiation physics, biophysics, and radiation biology [DE84-014885] p 174 N85-18557
- RADIOLYSIS**
- New estimates of asymmetric decomposition of racemic mixtures by natural beta-radiation sources p 211 A85-24440
- RANDOM PROCESSES**
- Effect of random perturbations on the controllability domain in ergatic dynamic systems p 203 A85-24030
- RANDOM SAMPLING**
- Reduction of display artifacts by random sampling p 204 A85-24291
- RANDOM VARIABLES**
- Drop in nervous-system load as a risk factor in the development of myocardial infarction p 182 A85-25618
- RANKING**
- Analysis of a visual performance experiment [DE85-000710] p 200 N85-19645
- READING**
- Panoramic vision and its applications p 192 A85-23277
- RECEPTORS (PHYSIOLOGY)**
- A mechanism for the effect of noise on the labyrinth p 165 A85-23209
- Receptive-field symmetry probed using converging gratings p 194 A85-24389
- REDUCED GRAVITY**
- Activation and localization of transport ATPase in cells of pea-seedling roots in hypogravity conditions p 169 A85-23305
- REDUNDANCY**
- Redundancy as a principle of the programming activity of the brain p 169 A85-23303
- REFLEXES**
- The dynamics of reflexive operations in productive thinking activity p 191 A85-23227
- REINFORCING FIBERS**
- Reinforcement Kevlar or fiberglass in the HGU helmet shell p 201 A85-22763
- RELAXATION (PHYSIOLOGY)**
- Psychophysiological study of visual fatigue and recovery of the initial level of work capacity p 177 A85-23152
- REMOTE MANIPULATOR SYSTEM**
- Simulation p 197 N85-18024
- RENAL FUNCTION**
- Severe renal insufficiency due to hyperuricemia and urate nephrolithiasis p 180 A85-23221
- The structure of the renal artery wall during restricted motor activity p 166 A85-23234
- The morphofunctional characteristics of intraorgan arterial vessels in the kidney in the normal state and in certain cardiovascular diseases p 180 A85-23239
- Efficiency of the Eleutherococcus treatment of enuresis p 181 A85-23261
- Endocrine structure of the kidneys in hypertensive disease p 181 A85-23263
- The morphological basis of a 'minimization function' for the nephron epithelium during uniform hyperthermia p 169 A85-23301
- REPORTS**
- USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-85-011] p 177 N85-19616
- RESEARCH AND DEVELOPMENT**
- Restraint improvement retrofit program - Objectives and requirements p 200 A85-22759
- Spacesuit development - The American experience p 202 A85-23123
- A system-level approach to automation research p 202 A85-23197
- United States Air Force undergraduate pilot training today and tomorrow [SAE PAPER 841589] p 196 A85-25987
- RESEARCH MANAGEMENT**
- Biomechanical studies of impact acceleration research [AD-A149077] p 176 N85-19601
- RESPIRATION**
- Mercury health effects update: Health issue assessment [PB85-123925] p 190 N85-19639

RESPIRATORS

USAFSAM integration laboratory assessments of the Advanced Chemical Defence Aircrew Respirator (ACDAR) p 200 A85-22756

RESPIRATORY DISEASES

Ways to enhance the efficiency of the correction of hypoxic states p 182 A85-23311

RESPIRATORY PHYSIOLOGY

Ventilation and acid-base balance in awake dogs exposed to heat and CO₂ p 172 A85-25709

An estimate of the efficiency of intrapulmonary gas exchange during muscular work in hypoxic conditions p 184 A85-26259

RESPIRATORY RATE

Scattering of electromagnetic waves by human body and its applications p 185 N85-18572

RESPIRATORY SYSTEM

Respiratory chain of alkalophilic bacteria [DE84-012558] p 174 N85-18556

REST

Mechanism for the increase of arterial pressure in a state of rest and during physical exercise in patients with hypertension p 182 A85-23312

RETENTION (PSYCHOLOGY)

Problems of psychological support of automated organization control systems p 197 N85-18570

RETINA

A mathematical model of visual perception regarding peripheral vision and its application to the Hermann's illusion p 195 A85-25199

RETINAL ADAPTATION

Tyrosine administration enhances dopamine synthesis and release in light-activated rat retina p 170 A85-24500

RETINAL IMAGES

Visual processing of moving stimuli p 193 A85-24383

Vision in the presence of known natural retinal image motion p 193 A85-24384

Smooth pursuit of small-amplitude sinusoidal motion p 193 A85-24385

Sequential recruitment in the discrimination of velocity p 193 A85-24386

Spatial and temporal parameters of motion detection in the peripheral visual field p 193 A85-24387

Receptive-field symmetry probed using converging gratings p 194 A85-24389

Visual responses to vorticity and the neural analysis of optic flow p 194 A85-24390

Spatiotemporal energy models for the perception of motion p 194 A85-24391

RETROFITTING

Restraint improvement retrofit program - Objectives and requirements p 200 A85-22759

RHEOENCEPHALOGRAPHY

Scintigraphy and emission computer tomography of the head in the diagnosis of intracranial vascular congestion p 180 A85-23246

RHEOLOGY

The state of the central and cerebral hemodynamics in normal subjects and in patients with incipient cerebral circulation insufficiency p 180 A85-23247

RHYTHM (BIOLOGY)

Configurational generators of neural rhythm p 167 A85-23259

The physiology of ultradian rhythms and their role in affecting disease resistance [AD-A148842] p 185 N85-18575

RIBONUCLEIC ACIDS

Cell surface RNA - A possible molecular receptor for adaptogens p 166 A85-23252

ROBOTICS

Human factors in robotics p 202 A85-23198

ROBOTS

A system-level approach to automation research p 202 A85-23197

Force feedback in a manipulator control system p 205 A85-25584

ROLL

Some effects of display format variables on the perception of aircraft spatial orientation p 210 N85-19666

ROTARY WING AIRCRAFT

Advanced emergency breathing systems p 201 A85-22773

S

SACCADIC EYE MOVEMENTS

Interaction between saccade and tracking vergence p 194 A85-24501

SCINTILLATION COUNTERS

Scintigraphy and emission computer tomography of the head in the diagnosis of intracranial vascular congestion p 180 A85-23246

SEA LEVEL

Hemodynamics responses to upright tilt at sea level and high altitude [AD-A148848] p 189 N85-19634

SEARCH PROFILES

Guide to human factors information sources [AD-A149102] p 208 N85-19649

SEDIMENTARY ROCKS

Ammonium contents of biotites from Precambrian rocks in Finland - The significance of NH4(+) as a possible chemical fossil p 212 A85-25839

SEMANTICS

Extraction of a complex signal from memory p 193 A85-23288

SENSITIVITY

Quantum noise and the threshold of hearing p 170 A85-25043

SENSORIMOTOR PERFORMANCE

Adaptivity of the eye-hand system of a human operator p 190 A85-23154

Psychophysiological methods for the assessment of the state of a human operator during the controlled effect of ethanol p 178 A85-23157

A method for comparing the simple sensorimotor responses of interacting operators p 202 A85-23166

Functional work load on an operator for various regimes of the movement of closed eyes p 191 A85-23244

Method for the experimental study of visual-motor coordination p 192 A85-23282

The variability of functional system structure during physical activity and in the presence of fatigue p 183 A85-25643

The integration of motor and vegetative functions during muscular work p 183 A85-25645

Effect of modulated ultrahigh frequency field on behavior and hormone level in female rats under emotional stress p 175 N85-18562

SENSORY FEEDBACK

Method for the experimental study of visual-motor coordination p 192 A85-23282

SENSORY PERCEPTION

Spatial localization and projection of sensory images p 193 A85-23314

SENSORY STIMULATION

General features of sensory processes under the effects of extreme stimuli p 171 A85-25644

SERUMS

Alcohol dehydrogenase in the blood serum of healthy persons and of patients with chronic alcoholism p 182 A85-23292

Specific differences and seasonal fluctuations in blood serum enzyme activity in experimental animals p 172 A85-26252

SERVOMECHANISMS

Servo operated anti-G suit pressurization system [AD-D011468] p 208 N85-19651

SICKNESSES

Morbidity and mortality associated with exposure to Otto Fuel II in the U.S. Navy 1966-1979 p 185 N85-18574

SIGNAL ANALYSIS

Development of a complex of programs of spectral EEG analysis for the operational diagnostics of the functional state of human operators p 178 A85-23163

Prospects for the use of models of autoregression-sliding mean type for EEG analysis p 182 A85-23306

SIGNAL PROCESSING

Neurocognitive pattern analysis of an auditory and visual numeric motor control task. Part 1: Development of methods [AD-A148809] p 198 N85-18578

SIGNS AND SYMPTOMS

The syncopal state associated with moderate craniocerebral trauma p 179 A85-23220

The state of the central and cerebral hemodynamics in normal subjects and in patients with incipient cerebral circulation insufficiency p 180 A85-23247

SILICATES

The effect of silicates on the thermal stability of amino acids p 211 A85-25568

SINE WAVES

Modulated sinusoidal currents in management of vibration sickness p 187 N85-19612

SKIN (ANATOMY)

Investigation of the dynamics of the automicrflora of the skin and fauces, and the bacterial contamination of the underclothes of mine workers p 202 A85-23273

Effect of cutaneous denervation of face and trunk on thermoregulatory responses to cold in rats p 171 A85-25701

SPECIFICS

Specifics of human thermal regulatory reactions upon exposure to coriolis acceleration p 187 N85-19617

SKIN RESISTANCE

The effect of a task on human skin mechanoreceptor response p 192 A85-23284

A-16

SUBJECT INDEX

SKIN TEMPERATURE (BIOLOGY)

Specifics of human thermal regulatory reactions upon exposure to coriolis acceleration p 187 N85-19617

SLEEP

Efficiency of the Eleutherococcus treatment of enuresis p 181 A85-23261

Electrosleep therapy advanced at medical institute p 188 N85-19623

SLEEP DEPRIVATION

The hemodynamics of various stages of nighttime sleep in patients with preliminary symptoms of cerebral hemodynamic deficiency p 180 A85-23248

The effect of paradoxical sleep deprivation on the learning of the active avoidance reaction p 173 A85-26261

Effects of partial deprivation of slow-wave sleep on sleep-wakefulness cycles p 187 N85-19613

SOCIAL FACTORS

Effect of intragroup favoritism in laboratory and natural conditions p 191 A85-23243

Interpersonal activity in conditions of group learning p 192 A85-23278

An investigation of the psychological aspects of individual manifestations of sociability in humans p 192 A85-23281

Style of personal contact as a factor in the efficiency of communal activity p 193 A85-23289

SODIUM

The connection between the parameters of sodium and potassium distribution and the contractile properties of muscles p 169 A85-23307

SOIL SCIENCE

Growth of soil bacteria in presence of Martian soil analog, carbon dioxide and hydrogen peroxide p 175 N85-18560

SORPTION

Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelenghts. Report 2: Adsorption of alcyan blue by external premembranous components p 175 N85-18565

SOUND WAVES

Effect of low-frequency acoustic oscillations and certain erythrocyte membrane components in vitro p 165 A85-23218

SPACE FLIGHT STRESS

Research opportunities in human behavior and performance p 199 N85-19640

SPACE MISSIONS

A system-level approach to automation research p 202 A85-23197

SPACE PERCEPTION

Spatial localization and projection of sensory images p 193 A85-23314

Tilt from a head-inverted position produces displacement of visual subjective vertical in the opposite direction p 195 A85-25790

Meridional anisotropy of spatial displacement detection p 195 A85-25791

SPACE PROCESSING

Energy transfer in plants in weightlessness p 170 A85-24193

SPACE SUITS

Spacesuit development - The American experience p 202 A85-23123

SPACEBORNE EXPERIMENTS

Energy transfer in plants in weightlessness p 170 A85-24193

SPACECRAFT ENVIRONMENTS

An overview of medical-biological radiation hazards in earth orbits p 203 A85-23811

SPACECREWS

An overview of medical-biological radiation hazards in earth orbits p 203 A85-23811

SPATIAL DISTRIBUTION

Psychological aspects of the phenomenon of spatial synchronization of potentials p 192 A85-23280

The dynamics of an extremely slow omega-potential and EEG spatial synchronization in the presence of muscle fatigue p 183 A85-25646

SPATIAL FILTERING

Discontinuity limits for the generation of visual motion aftereffects with sine- and square-wave gratings p 194 A85-24388

Receptive-field symmetry probed using converging gratings p 194 A85-24389

Elaborated Reichardt detectors p 204 A85-24392

Model of human visual-motion sensing p 194 A85-24393

SPATIAL RESOLUTION

Spatial and temporal parameters of motion detection in the peripheral visual field p 193 A85-24387

Spatial contrast detection for colour patterns under selective chromatic adaptation p 195 A85-25815

SPECTRAL SENSITIVITY

Color measurement and discrimination p 206 N85-18579

STANDARDS

Hygienic standardization of whole-body vibration p 178 A85-23205

Health standards for general vibration p 186 N85-19607

STATIONS

Sector suite man-machine functional capabilities and performance requirements p 207 N85-19647

STEREOSCOPIC VISION

The colours are not on the display - A survey of non-veridical perceptions that may turn up on a colour display p 195 A85-25814

STRATOSPHERE

Health assessment document for carbon tetrachloride p 190 N85-19638

STRESS (PHYSIOLOGY)

Responses of people to heat load in saunas p 178 A85-23203

The evaluation of summary vibration load and some biomedical factors in determining the risk of vibration-induced illness in miners p 179 A85-23206

Dose assessment of noise load on tractor operators in agriculture p 179 A85-23210

Changes in the size of the long tubular bones and body mass of rats under physical loads graded according to the time of day p 166 A85-23235

The structural characteristics of the metacarpal bones of athletes practising a variety of sports p 180 A85-23236

Carbohydrate metabolism and acid-base equilibrium in relation to nutrition in persons performing physical and mental work in the Estonian SSR p 181 A85-23274

The integration of motor and vegetative functions during muscular work p 183 A85-25645

Maximal blood-circulation modes p 183 A85-25648

The effect of long-term stress on the hypophyseal-adrenal-gonad systems in rabbits of various ages p 172 A85-26254

Changes in central hemodynamic parameters under the influence of volume loading in a healthy state, and during experimental myocardial infarction p 173 A85-26258

Study of bodily functional status and quality of controlling action of power unit operators with various intensities of labor p 206 N85-18569

The physiology of ultradian rhythms and their role in affecting disease resistance p 185 N85-18575

Work physiology of operating personnel at power plants in arid regions p 207 N85-19606

Effects of overall vibration and noise on operational personnel p 207 N85-19608

Skeletal muscle metabolism during exercise is influenced by heat acclimation p 188 N85-19632

STRESS (PSYCHOLOGY)

A method for controlling the state of an operator in conditions of complex activity p 190 A85-23156

Assessment of functional reserves of an operator in a state of fatigue p 178 A85-23158

The stress index as an index of the work state of an operator p 178 A85-23164

The effect of success and failure on the human functional state p 191 A85-23229

A method for studying work activities --- of air navigator p 191 A85-23231

Carbohydrate metabolism and acid-base equilibrium in relation to nutrition in persons performing physical and mental work in the Estonian SSR p 181 A85-23274

Drop in nervous-system load as a risk factor in the development of myocardial infarction p 182 A85-25618

Effect of modulated ultrahigh frequency field on behavior and hormone level in female rats under emotional stress p 175 N85-18562

Research opportunities in human behavior and performance p 199 N85-19640

SUPINE POSITION

Tilt from a head-inverted position produces displacement of visual subjective vertical in the opposite direction p 195 A85-25790

SURVIVAL

An evaluation of the effectiveness of treatment based on survival rate tables p 182 A85-23299

Suspended animation for space flight p 172 A85-25832

SYNCHRONISM

The dynamics of an extremely slow omega-potential and EEG spatial synchronization in the presence of muscle fatigue p 183 A85-25646

THERAPY

SYNTHESIS (CHEMISTRY)

Protein synthesis and DNA replication in lymphocytes in an immune response p 167 A85-23266

SYSTEM EFFECTIVENESS

Estimation of the efficiency of two-goal differential-game ergatic control systems p 203 A85-24031

Certain problems in the automated assessment of the operating efficiency of man-machine systems p 203 A85-24035

SYSTEMS ANALYSIS

Assessment of the work capacity of ergatic systems p 203 A85-24032

SYSTEMS SIMULATION

Simulation model for assessing the combined effect of engineering and psychological factors on the efficiency of a man-machine system p 203 A85-24036

T

TABLES (DATA)

An evaluation of the effectiveness of treatment based on survival rate tables p 182 A85-23299

TARGET RECOGNITION

Smooth pursuit of small-amplitude sinusoidal motion p 193 A85-24385

Sequential recruitment in the discrimination of velocity p 193 A85-24386

TASK COMPLEXITY

A method for controlling the state of an operator in conditions of complex activity p 190 A85-23156

Functional work load on an operator for various regimes of the movement of closed eyes p 191 A85-23244

Effect of visual features of the stimulus material on the formation of functional units of memory p 191 A85-23245

The principles of experimental setup in models of complex human operator activities p 192 A85-23283

The effect of a task on human skin mechanoreceptor response p 192 A85-23284

A methodology for determining the parameters of a pilot as an information-processing control system p 203 A85-24033

TEACHING MACHINES

Some principles for the construction of an adaptive training system p 192 A85-23279

TECHNOLOGY ASSESSMENT

USAF Aerospace Biotechnology Research and Development p 200 A85-22755

Life Support System Program Office - 1983 corporate report p 201 A85-22761

Advanced emergency breathing systems p 201 A85-22773

Flight crew training technology: A review p 196 N85-18010

TELEOPERATORS

A system-level approach to automation research p 202 A85-23197

TEMPERATURE EFFECTS

Heat stress and personal protective equipment p 208 N85-19652

TEMPORAL RESOLUTION

Spatial and temporal parameters of motion detection in the peripheral visual field p 193 A85-24387

TERRAIN FOLLOWING AIRCRAFT

Observations of physiological and psychological effects of terrain following flight based on in-flight test experience p 209 N85-19657

THERAPY

The use of acupuncture to correct psychophysiological states in humans p 177 A85-23155

Effect of a low-frequency alternating magnetic field on the course of pyrogenic fever p 165 A85-23202

Effect of decimeter-range waves on the aggregation activity of thrombocytes, given different localizations of effects in victims of cerebral insult p 178 A85-23204

A comparative evaluation of various methods for the treatment of miners with vibration-induced and noise-induced pathologies p 179 A85-23207

Efficiency of the treatment of patients with vibration sickness by means of sinusoidal modulated currents p 179 A85-23212

Treatment of vibration sickness in coal miners by means of hyperbaric oxygenation p 179 A85-23213

Severe renal insufficiency due to hyperuricemia and urate nephrolithiasis p 180 A85-23221

Hematological complications of drug therapy p 180 A85-23223

Temporary endocardial electrocardiostimulation during disturbances of heart rhythm and conduction p 181 A85-23260

Efficiency of the Eleutherococcus treatment of enuresis p 181 A85-23261

An evaluation of the effectiveness of treatment based on survival rate tables p 182 A85-23299

- Ways to enhance the efficiency of the correction of hypoxic states p 182 A85-23311
- The pharmacological correction of fatigue --- Russian book p 169 A85-23725
- Change in ornithine carbamoyltransferase activity in rats after X-ray irradiation and the administration of a vitamin-coenzyme complex p 170 A85-24026
- Management of vibration sickness in coal mines by hyperbaric oxygenation p 186 N85-19609
- Comparative assessment of different treatment modalities in miners with vibration- and noise-induced disease p 186 N85-19610
- Management of microcirculatory disorders in vibration sickness p 186 N85-19611
- Modulated sinusoidal currents in management of vibration sickness p 187 N85-19612
- THERMAL ENVIRONMENTS**
- Physiological characterization of the work of the operating personnel of a power system in an arid zone p 179 A85-23219
- THERMAL INSULATION**
- A systems analysis of alternative concepts for aircar cold weather clothing [AD-A148805] p 206 N85-18580
- THERMAL STABILITY**
- The effect of silicates on the thermal stability of amino acids p 211 A85-25568
- THERMORECEPTORS**
- Effect of cutaneous denervation of face and trunk on thermoregulatory responses to cold in rats p 171 A85-25701
- THERMOREGULATION**
- Effect of cutaneous denervation of face and trunk on thermoregulatory responses to cold in rats p 171 A85-25701
- Muscle and femoral vein temperatures during short-term maximal exercise in heart failure p 183 A85-25702
- Angiotensin II. - Induced hypothermia in rats p 171 A85-25707
- Ventilation and acid-base balance in awake dogs exposed to heat and CO₂ p 172 A85-25709
- Specifics of human thermal regulatory reactions upon exposure to coriolis acceleration p 187 N85-19617
- THREE DIMENSIONAL MOTION**
- Spatiotemporal energy models for the perception of motion p 194 A85-24391
- THRESHOLDS (PERCEPTION)**
- Sequential recruitment in the discrimination of velocity p 193 A85-24386
- Quantum noise and the threshold of hearing p 170 A85-25043
- Suprathreshold contrast perception at different luminance levels p 195 A85-25774
- Quantitative measurement of human auditory acuity p 187 N85-19614
- THROMBOCYTES**
- Effect of decimeter-range waves on the aggregation activity of thrombocytes, given different localizations of effects in victims of cerebral insult p 178 A85-23204
- TIME DEPENDENCE**
- Influence of G-suit abdominal bladder inflation on gas exchange during +Gz stress p 171 A85-25706
- TISSUES (BIOLOGY)**
- The effect of an iron deficient diet on the formation of bone tissue p 168 A85-23275
- Bioelectrochemistry 2: Membrane phenomena [AD-A149132] p 176 N85-19602
- TOCOPHEROL**
- Redox processes in the rat myocardium under acute hypoxia p 172 A85-26251
- TOMOGRAPHY**
- Computer tomography of alveococcosis in the liver p 180 A85-23222
- Anatomical aspects of the use of computer tomography (Review of the non-Soviet literature) p 166 A85-23241
- Scintigraphy and emission computer tomography of the head in the diagnosis of intracranial vascular congestion p 180 A85-23246
- TOXIC DISEASES**
- Hematological complications of drug therapy p 180 A85-23223
- TOXIC HAZARDS**
- Some methodological approaches to predicting the functional state of the body associated with hazardous environmental factors p 167 A85-23268
- Effect of methylmethacrylate and acrylamide on the microsomal oxidation system in the rat liver p 168 A85-23294
- TOXICITY AND SAFETY HAZARD**
- Health assessment document for carbon tetrachloride [PB85-124196] p 190 N85-19638
- TRACKING PROBLEM**
- Algorithm for the computer identification and processing of the psychophysiological parameters of human operators in a tracking process p 202 A85-23162

TRAINING AIRCRAFT

- Tactical fighter aircraft training [SAE PAPER 841587] p 196 A85-25985
- T-45 training system - Concept and acquisition strategy [SAE PAPER 841588] p 205 A85-25986
- TRAINING ANALYSIS**
- Optimization of pilot-retraining programs with allowance for the individual qualities of the pilots p 204 A85-24038
- T-45 training system - Concept and acquisition strategy [SAE PAPER 841588] p 205 A85-25986
- TRAINING DEVICES**
- Dynamic training devices in CRM training p 197 N85-18018
- Use of airplanes for loft training p 197 N85-18019
- Simulation p 197 N85-18024
- Low cost training aids and devices p 197 N85-18025
- Study of cognitive styles of students in automated teaching system p 198 N85-19620

TRAINING EVALUATION

- Simulation p 197 N85-18024
- Low cost training aids and devices p 197 N85-18025
- Innovative approaches to recurrent training p 197 N85-18028

TRAINING SIMULATORS

- Some principles for the construction of an adaptive training system p 192 A85-23279

TRANSIENT RESPONSE

- Analysis of the transient response of temporal artery blood flow data relative to various anti-G suit pressure schedules p 190 N85-19660

TRANSMITTERS

- Methodical approaches to determination of sanitation protective zone dimensions around TV centers and TV retransmitters p 185 N85-18563

TRANSPORT AIRCRAFT

- The man in the cockpit of a modern commercial aircraft p 205 A85-25511

TREES (PLANTS)

- Gravitational adaptation in forest trees p 166 A85-23224

TRYPSIN

- The use of enzymes to correct the immune response under vibration loading p 165 A85-23215

TUMORS

- Radiation physics, biophysics, and radiation biology [DE84-014885] p 174 N85-18557

TYROSINE

- Tyrosine administration enhances dopamine synthesis and release in light-activated rat retina p 170 A85-24500

U**U.S.S.R.**

- USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-85-007] p 175 N85-18566

- USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-85-008] p 176 N85-19605

- USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-85-011] p 177 N85-19616

- USSR report: Life sciences. Biomedical and behavioral sciences [JPRS-UBB-85-009] p 177 N85-19625

ULTRAHIGH FREQUENCIES

- Effect of modulated ultrahigh frequency field on behavior and hormone level in female rats under emotional stress p 175 N85-18562

ULTRASONIC SCANNERS

- Significance of ultrasonic echo studies for human anatomy p 180 A85-23240

ULTRAVIOLET RADIATION

- Organization and efficiency of a team-basis method for the prophylactic ultraviolet irradiation of coal miners p 182 A85-23300

- Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 1: Expression of ABO and Rhesus system antigen p 175 N85-18564

- Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 2: Adsorption of alcyan blue by external premembranous components p 175 N85-18565

- Genetic effects of microwave exposure on mammalian cells in vitro. Volume 2, Appendix B: Cytogenetics and growth kinetics data, 1.2 GHz [AD-A148867] p 176 N85-19600

UNCONSCIOUSNESS

- The syncopal state associated with moderate craniocerebral trauma p 179 A85-23220

UNDERWATER PHYSIOLOGY

- Hydrogen-oxygen (hydrox) breathing at 1.3MPa [FOA-C-58015-H1] p 186 N85-18577

URIC ACID

- Severe renal insufficiency due to hyperuricemia and urate nephrolithiasis p 180 A85-23221

USER REQUIREMENTS

- Sector suite man-machine functional capabilities and performance requirements [AD-A148881] p 207 N85-19647

V**VARIABILITY**

- Variability of cardiac rhythm during information loading p 187 N85-19619

VASCULAR SYSTEM

- Certain conclusions and prospects of study pertaining to the vascular system in the case of limitations on motor activity p 166 A85-23232

- Modulated sinusoidal currents in management of vibration sickness p 187 N85-19612

- Specifics of human thermal regulatory reactions upon exposure to coriolis acceleration p 187 N85-19617

VASODILATION

- Angiotensin II. - Induced hypothermia in rats p 171 A85-25707

VEINS

- The state of the sanguiferous bed of the vascular tunic of the eyeball and retrobulbar formations in association with experimental vascular congestion p 166 A85-23237

- The relief characteristics of the internal surface of the cardiac ventricles and Viessen-Thebesian vessels p 180 A85-23238

- Muscle and femoral vein temperatures during short-term maximal exercise in heart failure p 183 A85-25702

VELOCITY MEASUREMENT

- Sequential recruitment in the discrimination of velocity p 193 A85-24386

- Model of human visual-motion sensing p 194 A85-24393

VERBAL COMMUNICATION

- Multiple resources and brain laterality [AD-A148912] p 199 N85-19643

VERTEBRATES

- Free amino acids in the brains of some vertebrates p 169 A85-23308

VERTICAL ORIENTATION

- Meridional anisotropy of spatial displacement detection p 195 A85-25791

VERTICAL PERCEPTION

- Tilt from a head-inverted position produces displacement of visual subjective vertical in the opposite direction p 195 A85-25790

VESTIBULAR TESTS

- The age-related aspects of vestibular function in patients with chronic purulent otitis media according to cupulometry data p 181 A85-23264

VIBRATION

- Health standards for general vibration p 186 N85-19607

- Effects of overall vibration and noise on operational personnel p 207 N85-19608

VIBRATION EFFECTS

- Hygienic standardization of whole-body vibration p 178 A85-23205

- The evaluation of summary vibration load and some biomedical factors in determining the risk of vibration-induced illness in miners p 179 A85-23206

- A comparative evaluation of various methods for the treatment of miners with vibration-induced and noise-induced pathologies p 179 A85-23207

- Effect of total-body vibration and noise on the functional state of human operators p 179 A85-23211

- Efficiency of the treatment of patients with vibration sickness by means of sinusoidal modulated currents p 179 A85-23212

- Treatment of vibration sickness in coal miners by means of hyperbaric oxygenation p 179 A85-23213

- The use of enzymes to correct the immune response under vibration loading p 165 A85-23215

- Experience with the early diagnosis and prevention of the vibration sickness of construction workers p 181 A85-23271

- Prevention measures for the adverse effects of vibration --- on flight personnel p 183 A85-25620

VIBRATIONAL STRESS

- The correction of microcirculatory disorders from vibrational illness p 179 A85-23208

SUBJECT INDEX

- Objective evaluation of vegetovascular dystonia and psychoemotional disturbances in patients with vibration sickness p 179 A85-23214
- VIDEO COMMUNICATION**
Video concepts in CRM training p 197 N85-18015
- VIKING MARS PROGRAM**
Life on the terrestrial planets? p 211 A85-25674
- VISCOSITY**
Blood viscosity responses to acute exercise and aerobic conditioning in women p 185 N85-18573
- VISIBILITY**
Selecting one among the many: A simple network implementing shifts in selective visual attention
[AD-A148989] p 199 N85-19644
- Analysis of a visual performance experiment
[DE85-000710] p 200 N85-19645
- VISUAL ACCOMMODATION**
Laser optometric assessment of visual display viewability p 200 A85-22590
- VISUAL ACUITY**
An analysis of light and technical parameters for visual acuity measurement devices and some methods for their standardization p 202 A85-23304
- VISUAL AIDS**
Dialog system of preparation and presentation of visual information p 198 N85-19622
- VISUAL CONTROL**
Adaptivity of the eye-hand system of a human operator p 190 A85-23154
- Neurocognitive pattern analysis of an auditory and visual numeric motor control task. Part 1: Development of methods
[AD-A148809] p 198 N85-18578
- VISUAL DISCRIMINATION**
Sequential recruitment in the discrimination of velocity p 193 A85-24386
- Loss of spatial phase relationships in extrafoveal vision p 194 A85-24433
- Color measurement and discrimination
[NASA-CR-3824] p 206 N85-18579
- VISUAL FIELDS**
Visual responses to vorticity and the neural analysis of optic flow p 194 A85-24390
- VISUAL PERCEPTION**
Introduction to color vision p 190 A85-22589
- Psychophysiological study of visual fatigue and recovery of the initial level of work capacity p 177 A85-23152
- Method for the experimental study of visual-motor coordination p 192 A85-23282
- Reduction of display artifacts by random sampling p 204 A85-24291
- A simple analytic expression for the contrast sensitivity of the human eye as a function of brightness p 204 A85-24302
- Model of human visual-motion sensing p 194 A85-24393
- A mathematical model of visual perception regarding peripheral vision and its application to the Hermann's illusion p 195 A85-25199
- Suprathreshold contrast perception at different luminance levels p 195 A85-25774
- Neural dynamics of brightness perception - Features, boundaries, diffusion, and resonance p 195 A85-25789
- The colours are not on the display - A survey of non-veridical perceptions that may turn up on a colour display p 195 A85-25814
- Visual flow and direction of locomotion p 196 A85-25825
- A model of a constant color perception pattern for the case of continuous spectral functions p 184 A85-26296
- Nonlinear and parametric resonance in human hearing and sight organs p 174 A85-26297
- Restructuring of the process of visual recognition as perception conditions alter p 199 N85-19624
- Multiple resources and brain laterality
[AD-A148912] p 199 N85-19643
- Selecting one among the many: A simple network implementing shifts in selective visual attention
[AD-A148989] p 199 N85-19644
- Some effects of display format variables on the perception of aircraft spatial orientation p 210 N85-19666
- VISUAL SIGNALS**
Changing system and display concepts and their impact on aircrew performance p 209 N85-19665
- VISUAL STIMULI**
Visual processing of moving stimuli p 193 A85-24383
- Determination of functional mobility of human nervous system with the PNN-3 instrument p 187 N85-19618
- VISUAL TASKS**
Assessment of functional reserves of an operator in a state of fatigue p 178 A85-23158

Effect of visual features of the stimulus material on the formation of functional units of memory p 191 A85-23245

Meridional anisotropy of spatial displacement detection p 195 A85-25791

VITAMINS

Change in ornithine carbamoyltransferase activity in rats after X-ray irradiation and the administration of a vitamin-coenzyme complex p 170 A85-24026

VORTICITY

Visual responses to vorticity and the neural analysis of optic flow p 194 A85-24390

W

WAKEFULNESS

Ventilation and acid-base balance in awake dogs exposed to heat and CO₂ p 172 A85-25709

Effects of partial deprivation of slow-wave sleep on sleep-wakefulness cycles p 187 N85-19613

WALKING

The locomotor region of the truncus cerebi and the hypothesis of a locomotor column p 174 A85-26287

WARFARE

Servo operated anti-G suit pressurization system
[AD-D011468] p 208 N85-19651

Impact of future aircombat characteristics on pilot performance and cockpit design p 209 N85-19661

WATER IMMERSION

Immersion suits, past and present p 201 A85-22771

WATER RESOURCES

Closed-loop concepts for the Army: Water conservation, recycle, and reuse

[AD-A148839] p 207 N85-18581

WEIGHT REDUCTION

Reinforcement Kevlar or fiberglass in the HGU helmet shell p 201 A85-22763

WEIGHTLESSNESS

Investigation of the goal-directed motions of a human in an unsupported state p 204 A85-24037

Energy transfer in plants in weightlessness p 170 A85-24193

Gravity and biological systems: Emphasis on human physiology
[ESA-BR-21] p 174 N85-18558

WEIGHTLESSNESS SIMULATION

Activation and localization of transport ATPase in cells of pea-seedling roots in hypogravity conditions p 169 A85-23305

WORK

Sector suite man-machine functional capabilities and performance requirements

[AD-A148881] p 207 N85-19647

WORK CAPACITY

Methodology and techniques of psychophysiological studies of operator activity p 177 A85-23151

Psychophysiological study of visual fatigue and recovery of the initial level of work capacity p 177 A85-23152

Effect of daily routine on the functional state of operators according to heart-rhythm parameters p 177 A85-23153

A method for controlling the state of an operator in conditions of complex activity p 190 A85-23156

Assessment of functional reserves of an operator in a state of fatigue p 178 A85-23158

The stress index as an index of the work state of an operator p 178 A85-23164

Hygienic standardization of whole-body vibration p 178 A85-23205

The evaluation of summary vibration load and some biomedical factors in determining the risk of vibration-induced illness in miners p 179 A85-23206

Physiological characterization of the work of the operating personnel of a power system in an arid zone p 179 A85-23219

A method for studying work activities --- of air navigator p 191 A85-23231

The hemodynamics of various stages of nighttime sleep in patients with preliminary symptoms of cerebral hemodynamic deficiency p 180 A85-23248

Interrelationship between learning and development in the process of mastering an occupational activity p 192 A85-23285

Automation of an investigation procedure using a 16-factor personality questionnaire p 192 A85-23286

The pharmacological correction of fatigue --- Russian book p 169 A85-23725

Assessment of the work capacity of ergotic systems p 203 A85-24032

Prevention measures for the adverse effects of vibration --- on flight personnel p 183 A85-25620

Work capacity of heat and electric power plant operations working 12 hour day and night shifts p 206 N85-18567

WORKLOADS (PSYCHOPHYSIOLOGY)

WORK-REST CYCLE

Effect of daily routine on the functional state of operators according to heart-rhythm parameters p 177 A85-23153

Effects of partial deprivation of slow-wave sleep on sleep-wakefulness cycles p 187 N85-19613

WORKLOADS (PSYCHOPHYSIOLOGY)

Methodology and techniques of psychophysiological studies of operator activity p 177 A85-23151

The effect of paradoxical sleep deprivation on the learning of the active avoidance reaction p 173 A85-26261

Dynamic training devices in CRM training p 197 N85-18018

Improvement of workload estimation techniques in piloting tasks

[NASA-CR-174374] p 207 N85-19646

Aircrew and avionics: Friends or Foes?

p 208 N85-19654

Impact of future aircombat characteristics on pilot performance and cockpit design p 209 N85-19661

Grasp of information by the pilot in future combat aircraft p 209 N85-19662

Pilot workload, performance and aircraft control automation p 210 N85-19670

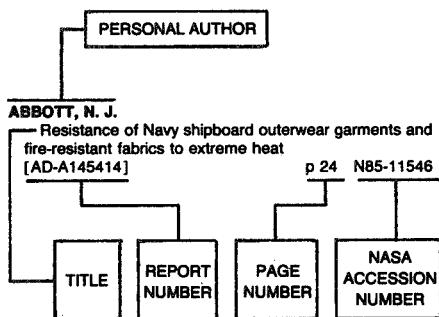
Aircrew-aircraft integration issues in future US Army helicopters p 210 N85-19672

PERSONAL AUTHOR INDEX

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Supplement 272)

JUNE 1985

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document listed (e.g., NASA report, translation, NASA contractor report). The page and accession numbers are located beneath and to the right of the title. Under any one author's name the accession numbers are arranged in sequence with the AIAA accession numbers appearing first.

A

- ADAMS, J. H., JR. Radiation doses and biological effects of cosmic rays p 165 A85-22853
- ADELSON, E. H. Spatiotemporal energy models for the perception of motion p 194 A85-24391
- ADYSHIRIN-ZADE, E. A. The relief characteristics of the internal surface of the cardiac ventricles and Viessen-Thebesian vessels p 180 A85-23238
- AGAEV, M. M. Severe renal insufficiency due to hyperuricemia and urate nephrolithiasis p 180 A85-23221
- AGEEV, V. S. Effect of intragroup favoritism in laboratory and natural conditions p 191 A85-23243
- AHUMADA, A. J., JR. Reduction of display artifacts by random sampling p 204 A85-24291
- AIKEN, E. W. Model of human visual-motion sensing p 194 A85-24393
- ALABOVSKII, V. V. The role of mitochondria in the regulation of Ca(2+) transmembrane current in myocardial cells p 173 A85-26285
- ALEKSANDROV, Iu. I. The effect of a task on human skin mechanoreceptor response p 192 A85-23284
- ALEKSEEV, G. I. Effect of lethal and superlethal doses of gamma radiation on the activity of lysosomal enzymes in radio-sensitive and radio-resistant rat tissues p 168 A85-23297
- ALEKSEEV, S. V. A mechanism for the effect of noise on the labyrinth p 165 A85-23209
- ALEKSINA, L. A. Changes in the size of the long tubular bones and body mass of rats under physical loads graded according to the time of day p 166 A85-23235

- ALLISON, T. Electrical sources in human somatosensory cortex Identification by combined magnetic and potential recordings p 184 A85-25824
- AMALBERTI, R. Grasp of information by the pilot in future combat aircraft p 209 N85-19662
- AMMERMAN. Sector suite man-machine functional capabilities and performance requirements p 207 N85-19647
- ANANIN, V. F. An analysis of light and technical parameters for visual acuity measurement devices and some methods for their standardization p 202 A85-23294
- ANDOSOV, Iu. M. Noise protection of workers in the sawmill and wood-processing industry p 179 A85-23216
- ANDREEVA, E. A. Method for the experimental study of visual-motor coordination p 192 A85-23282
- ANDRECHEV, N. A. Amplitude characteristics of the electric field of the heart p 181 A85-23262
- ANICHIN, V. F. A mechanism for the effect of noise on the labyrinth p 165 A85-23209
- ARDREY. Sector suite man-machine functional capabilities and performance requirements p 207 N85-19647
- ARGENTOVA, T. E. Style of personal contact as a factor in the efficiency of communal activity p 193 A85-23289
- ARKHANGELSKAIA, G. G. Changes in the composition of mitochondrial lipids in the presence of dinitrophenol under hypoxic conditions p 168 A85-23291
- ARNALL, D. A. Epinephrine is unessential for stimulation of liver glycogenolysis during exercise p 172 A85-25708
- ARTEMeva, E. IU. A method for studying work activities p 191 A85-23231
- ARTISHUK, V. N. Effect of daily routine on the functional state of operators according to heart-rhythm parameters p 177 A85-23153
- ARTSISHEVSKAYA, R. A. Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 1: Expression of ABO and Rhesus system antigen p 175 N85-18564
- ARTSISHEVSKAYA, R. A. Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 2: Adsorption of alcyan blue by external premembranous components p 175 N85-18565
- AVAKIAN, G. N. Application of active oculography and electroneuromyography to analyze the effect of drugs p 178 A85-23165
- BABENKOV, N. V. Scintigraphy and emission computer tomography of the head in the diagnosis of intracranial vascular congestion p 180 A85-23246
- BALABANOVA, V. A. Slow negative potentials and probabilistic prediction p 178 A85-23160
- BALAN, G. M. The evaluation of summary vibration load and some biomedical factors in determining the risk of vibration-induced illness in miners p 179 A85-23206
- BANDY, J. T. Closed-loop concepts for the Army: Water conservation, recycle, and reuse p 207 N85-18581
- BARYK, O. IA. Redox processes in the rat myocardium under acute hypoxia p 172 A85-26251
- BASILE, B. Abiotic synthesis of purines and other heterocyclic compounds by the action of electrical discharges p 211 A85-23868
- BASYBEKOVA, K. E. Method for the experimental study of visual-motor coordination p 192 A85-23282
- BATURIN, N. A. The effect of success and failure on the human functional state p 191 A85-23229
- BAZIAN, A. S. An analysis of the regulation of noradrenaline secretion by autoadreno-receptors and frequency stimulation p 167 A85-23258
- BEATON, R. J. Human performance evaluations of digital image quality p 200 A85-22592
- BEEMAN, P. An evaluation of system quality metrics for hard-copy and soft-copy displays of digital imagery p 204 A85-24301
- BELOSHITSKII, P. V. Influence of G-suit abdominal bladder inflation on gas exchange during +Gz stress p 171 A85-25706
- BELOUSOV, V. V. The function of the adrenal cortex and the ovaries in normal subjects and in patients with iron deficiency anemia from an arid region during adaptation to mountain conditions p 184 A85-26260
- BELOUSOVA, G. N. Functional role of type of person's temperament in individual and mutual activity p 198 N85-19621
- BELOUSOV, G. N. The structure of the renal artery wall during restricted motor activity p 166 A85-23234
- BEREZKIN, B. S. Problems of psychological support of automated organization control systems p 197 N85-18570
- BEREZKIN, B. S. Problems of psychological support of automated organization control systems p 198 N85-18571
- BERGEN, J. R. Sector suite man-machine functional capabilities and performance requirements p 207 N85-19647
- BERKINBLIT, M. B. Spatiotemporal energy models for the perception of motion p 194 A85-24391
- BERKINBLIT, M. B. An analysis of the regulation of noradrenaline secretion by autoadreno-receptors and frequency stimulation p 167 A85-23258
- BERMAN, S. Analysis of a visual performance experiment [DE85-000710] p 200 N85-19645
- BEVERLEY, K. I. Visual responses to vorticity and the neural analysis of optic flow p 194 A85-24390
- BEZVERKHAIA, T. P. The function of the adrenal cortex and the ovaries in normal subjects and in patients with iron deficiency anemia from an arid region during adaptation to mountain conditions p 184 A85-26260
- BIALEK, W. Quantum noise and the threshold of hearing p 170 A85-25043
- BIDZILIA, Iu. P. An investigation of the isovolumic indices of myocardial contractility in response to directed changes in heart function p 173 A85-26257
- BILAVSKA, N. O. Activation and localization of transport ATPase in cells of pea-seedling roots in hypogravity conditions p 169 A85-23305

A
U
T
H
O
R

- BITKIN, S. V.**
Methodical approaches to determination of sanitation protective zone dimensions around TV centers and TV transmitters p 185 N85-18563
- BLAMONT, J.**
Life on the terrestrial planets? p 211 A85-25674
- BOBKOV, IU. G.**
The pharmacological correction of fatigue p 169 A85-23725
- BOBRISHCHEVA-PUSHKINA, N. D.**
Success in learning occupation of chemical production technician as function of certain personality traits and development of psychophysiological functions p 206 N85-18568
- BOGDARIN, IU. A.**
Fatty acid metabolism in the myocardium under normal conditions and in cardiac disease (Survey) p 168 A85-23290
- BOGDASHEVSKII, R. B.**
Some perspectives on the study and improvement of the cognitive-creative activity of an individual and a group p 191 A85-23276
- BOIARINOV, G. A.**
Fatty acid metabolism in the myocardium under normal conditions and in cardiac disease (Survey) p 168 A85-23290
- BOIKII, I. V.**
Alcohol dehydrogenase in the blood serum of healthy persons and of patients with chronic alcoholism p 182 A85-23292
- BOLSHUNOV, A. IA.**
The dynamics of reflexive operations in productive thinking activity p 191 A85-23227
- BONDAR, Y. I.**
Restructuring of the process of visual recognition as perception conditions alter p 199 N85-19624
- BONDARENKO, L. A.**
The effect of long-term stress on the hypophyseal-adrenal-gonad systems in rabbits of various ages p 172 A85-26254
- BONE, C. M.**
Morbidity and mortality associated with exposure to Otto Fuel II in the U.S. Navy 1966-1979 p 185 N85-18574
- BONNER, W. A.**
Beta-decay, Bremsstrahlen, and the origin of molecular chirality p 211 A85-23869
- BORODIN, IU. S.**
Alcohol dehydrogenase in the blood serum of healthy persons and of patients with chronic alcoholism p 182 A85-23292
- BOROUGH, H.**
A simple analytic expression for the contrast sensitivity of the human eye as a function of brightness p 204 A85-24302
- BOURDY, C.**
Spatial contrast detection for colour patterns under selective chromatic adaptation p 195 A85-25815
- BOUREAU, E.**
Precambrian fossils and the origins of biologic organization p 211 A85-25667
- BRACKEN, M. E.**
Epinephrine is unessential for stimulation of liver glycogenolysis during exercise p 172 A85-25708
- BRAGIN, E. O.**
Neurochemical mechanisms for the regulation of pain sensitivity p 173 A85-26286
- BRAUSER, K.**
Error management methods in the cockpits of high-performance aircraft p 205 A85-25512
- BRESSLER, S. L.**
Neurocognitive pattern analysis of an auditory and visual numeric motor control task. Part 1: Development of methods p 198 N85-18578
- BRODSKII, B. L.**
An analysis of the regulation of noradrenaline secretion by autoreceptors and frequency stimulation p 167 A85-23258
- BRUCE**
Sector suite man-machine functional capabilities and performance requirements p 207 N85-19647
- BRUNS, D. E.**
Chronic exercise and left ventricular structure and function in healthy human subjects p 184 A85-25703
- BRUSHKO, I. B.**
Ways to enhance the efficiency of the correction of hypoxic states p 182 A85-23311
- BRUSHLINSKII, A. V.**
Activity, act, and the psychic as a process p 191 A85-23226
- BRUTSENTSOVA, T. A.**
Study of cognitive styles of students in automated teaching system p 198 N85-19620

- BUIAKAS, T. M.**
Functional work load on an operator for various regimes of the movement of closed eyes p 191 A85-23244
- BUSOV, V. I.**
Experience with a centralized provision for individual radiation-dose monitoring p 202 A85-23270

C

- CADARETTE, B. S.**
Skeletal muscle metabolism during exercise is influenced by heat acclimation p 188 N85-19832
- CARLSON, K. I.**
Epinephrine is unessential for stimulation of liver glycogenolysis during exercise p 172 A85-25708
- CARROLL, P. W.**
Flight crew training technology: A review p 196 N85-18010
- CARROLL, J. E.**
Integrated approach to flight crew training p 197 N85-18014
- CARTER, D. I.**
USA Aerospace Biotechnology Research and Development p 200 A85-22755
- CASTINE, J. W.**
Advanced emergency breathing systems p 201 A85-22773
- CATLETT, W. J.**
T-45 training system - Concept and acquisition strategy p 205 A85-25986
- CHALYI, G. A.**
The use of enzymes to correct the immune response under vibration loading p 165 A85-23215
- CHAO, B. P.**
Human performance evaluations of digital image quality p 200 A85-22592
- CHASTOKOLENKO, L. V.**
The effect of magnetic fields on somatic cell division in plants p 169 A85-23302
- CHELNKOVA, I. S.**
The function of the adrenal cortex and the ovaries in normal subjects and in patients with iron deficiency anemia from an arid region during adaptation to mountain conditions p 184 A85-26260
- CHEMEZOV, S. V.**
The state of the sanguiferous bed of the vascular tunic of the eyeball and retrobulbar formations in association with experimental vascular congestion p 166 A85-23237
- CHENKOV, R.**
Efficiency of the Eleutherococcus treatment of enuresis p 181 A85-23261
- CHERNOKHVOSTOVA, E. V.**
Structural studies of human IgA1 and IgA2 immunoglobulins tagged with two different spin-labels p 181 A85-23251
- CHERNOV, K. A.**
The principles of experimental setup in models of complex human operator activities p 192 A85-23283
- CHIDZHAVADZE, E. O.**
Effects of partial deprivation of slow-wave sleep on sleep-wakefulness cycles p 187 N85-19613
- CHIRON, A.**
Spatial contrast detection for colour patterns under selective chromatic adaptation p 195 A85-25815
- CHKANNIKOV, A. N.**
An investigation of the cerebral hemodynamics of workers exposed to industrial noise p 181 A85-23265
- CHORLEY, R. A.**
Aircrew and avionics: Friends or Foes? p 208 N85-19654
- CHRISTENSEN, J. M.**
Research opportunities in human behavior and performance p 199 N85-19640
- CLARKSON, T.**
Mercury health effects update: Health issue assessment p 190 N85-19639
- CLEAR, R.**
Analysis of a visual performance experiment p 200 N85-19645
- COHEN, D.**
Electrical sources in human somatosensory cortex identification by combined magnetic and potential recordings p 184 A85-25824
- COHEN, M. A.**
Neural dynamics of brightness perception - Features, boundaries, diffusion, and resonance p 195 A85-25789
- COLLEWIJN, H.**
Vision in the presence of known natural retinal image motion p 193 A85-24384

CRANE, D. F.

- The effects of time delay in man-machine control systems: Implications for design of flight simulator Visual-Display-Delay compensation p 205 N85-17983
- CRANE, H. D.**
Generation-V dual-Purkinje-image eyetracker p 204 A85-25089

CRANMER, J.

- Mercury health effects update: Health issue assessment p 190 N85-19639
- CROSBIE, R. J.**

- Servo operated anti-G suit pressurization system p 208 N85-19651
- Analysis of the transient response of temporal artery blood flow data relative to various anti-G suit pressure schedules p 190 N85-19660

CUFFIN, B. N.

- Electrical sources in human somatosensory cortex identification by combined magnetic and potential recordings p 184 A85-25824

CUTILLO, B. A.

- Neurocognitive pattern analysis of an auditory and visual numeric motor control task. Part 1: Development of methods p 198 N85-18578

CUTTING, J. E.

- Visual flow and direction of locomotion p 196 A85-25825

CYERMAN, A.

- Hemodynamics responses to upright tilt at sea level and high altitude p 189 N85-19634

D**DAKHAB, T. V.**

- The dynamics of an extremely slow omega-potential and EEG spatial synchronization in the presence of muscle fatigue p 183 A85-25646

DARK, S. J.

- Medically disqualified airline pilots p 189 N85-19637

DARRAH, M. I.

- A computer model for prediction of pilot performance based on the addition of different weights at various locations on the head p 201 A85-22772

DAVYDOV, V. I.

- Algorithm for the computer identification and processing of the psychophysiological parameters of human operators in a tracking process p 202 A85-23162

DE MATTIELLO, M. L. F.

- Suprathreshold contrast perception at different luminance levels p 195 A85-25774

DEEV, A. A.

- Automation of an investigation procedure using a 16-factor personality questionnaire p 192 A85-23286

DETIARENKO, L. N.

- Effect of random perturbations on the controllability domain in ergodic dynamic systems p 203 A85-24030

DEKUTOVICH, G. V.

- Changes in the composition of mitochondrial lipids in the presence of dinitrophenol under hypoxic conditions p 168 A85-23291

DEMUROV, E. A.

- Change in the response of the heart to posthypoxic reoxygenation after injection of superoxide dismutase and its inhibitor p 171 A85-25617

DEROSA, C. T.

- Health assessment document for carbon tetrachloride p 190 N85-19638

DEVIANIN, E. A.

- Force feedback in a manipulator control system p 205 A85-25584

DEVIATKO, A. V.

- Energy transfer in plants in weightlessness p 170 A85-24193

DIKAIA, L. G.

- Development of a complex of programs of spectral EEG analysis for the operational diagnostics of the functional state of human operators p 178 A85-23163

DIKKER, V. E.

- The correction of microcirculatory disorders from vibrational illness p 179 A85-23208

DIVITA, J.

- Management of microcirculatory disorders in vibration sickness p 186 N85-19611

DONCHENKO, G. V.

- Effect of extreme peripheral light on dark adaptation p 189 N85-19636

DONCHENKO, G. V.

- Redox processes in the rat myocardium under acute hypoxia p 172 A85-26251

PERSONAL AUTHOR INDEX

- DOROFEEVA, I. K.**
Growth of soil bacteria in presence of Martian soil analog, carbon dioxide and hydrogen peroxide
p 175 N85-18560
- DOVGAILO, A. A.**
An investigation of the cerebral hemodynamics of workers exposed to industrial noise p 181 A85-23265
- DOYLE, J. C.**
Neurocognitive pattern analysis of an auditory and visual numeric motor control task. Part 1: Development of methods
[AD-A148809] p 198 N85-18578
- DROGALINA, ZH. A.**
Probabilistic model of the unconscious - The unconscious as manifestation of a semantic universe
p 193 A85-23287
- DUBNER, P. N.**
Prospects for the use of models of autoregression-sliding mean type for EEG analysis p 182 A85-23306
- DUMANSKI, IU. D.**
Hygienic standards for electromagnetic radiation in the home p 168 A85-23269
- DUMANSKIY, Y. D.**
Methodical approaches to determination of sanitation protective zone dimensions around TV centers and TV retransmitters p 185 N85-18563
- DUNIN-BARKOVSKII, V. L.**
Configurational generators of neural rhythm p 167 A85-23259
- DZHAVAD-ZADE, M. D.**
Severe renal insufficiency due to hyperuricemia and urate nephrolithiasis p 180 A85-23221
- DZHUMAGULOVA, A. S.**
Mechanism for the increase of arterial pressure in a state of rest and during physical exercise in patients with hypertension p 182 A85-23312

E

- EDWARDS, P. R.**
Servo operated anti-G suit pressurization system
[AD-D011468] p 208 N85-19651
- EEPIK, V. E.**
Protein metabolism in the muscles following muscular work p 171 A85-25647
- EFIMOVA, G. V.**
Investigation of the functional state of a human operator during the formation of a mental habit p 191 A85-23161
- EFUNI, S. N.**
Change in the response of the heart to posthypoxic reoxygenation after injection of superoxide dismutase and its inhibitor p 171 A85-25617
- EGOROV, I. A.**
The effect of silicates on the thermal stability of amino acids p 211 A85-25568
- EISENBERG, E.**
Muscle contraction and free energy transduction in biological systems p 172 A85-25822
- ELLIS, S. R.**
Influence of a perspective cockpit traffic display format on pilot avoidance maneuvers p 210 N85-19668
- EMERSON, T. J.**
The cockpit of the year 2000: How big a step? p 210 N85-19667
- ENDLICH, W. H.**
Oversight in Eurocontrol-Central, Maastricht UAC p 205 A85-25515
- ENGEL, B. T.**
Central control of cardiovascular adjustments to exercise p 184 A85-25704
- EPISHIN, A. V.**
Experience with a centralized provision for individual radiation-dose monitoring p 202 A85-23270
- EPISHKIN, A. K.**
The stress index as an index of the work state of an operator p 178 A85-23164
- ERASHCHENKO, N. A.**
Psychophysiological methods for the assessment of the state of a human operator during the controlled effect of ethanol p 178 A85-23157
- ETTINGER, R. C.**
Implications of guidance and control technology on human factors considerations p 209 N85-19656
- EVDOKIMOVA, T. A.**
The integration of motor and vegetative functions during muscular work p 183 A85-25645
- EVSTROPOV, V. M.**
Effect of decimeter waves on the relative content of T-lymphocytes in the lymphoid organs p 169 A85-23313

F

- FAKKENSHTEIN, S. E.**
A simulation of the regional deposition of air ions in human lungs p 181 A85-23255
- FALK, D. S.**
Receptive-field symmetry probed using converging gratings p 194 A85-24389
- FEDOROV, T. M.**
Functional work load on an operator for various regimes of the movement of closed eyes p 191 A85-23244
- FEDOROVSKAIA, E. A.**
A complex method for evaluating the color vision of patients with localized cerebral lesions p 180 A85-23230
- FEDOTOV, D. K.**
Study of bodily functional status and quality of controlling action of power unit operators with various intensities of labor p 206 N85-18569
- FEDOTOV, G. M.**
Effect of lethal and superlethal doses of gamma radiation on the activity of lysosomal enzymes in radio-sensitive and radio-resistant rat tissues p 168 A85-23297
- FEDURINA, M. A.**
Alcohol dehydrogenase in the blood serum of healthy persons and of patients with chronic alcoholism p 182 A85-23292
- FEIGIN, V. L.**
Climatological aspect of the epidemiology of acute disturbances of brain circulation (Review) p 180 A85-23249
- FESENKO, L. D.**
Ways to enhance the efficiency of the correction of hypoxic states p 182 A85-23311
- FESENKO, V. A.**
Experience with the early diagnosis and prevention of the vibration sickness of construction workers p 181 A85-23271
- FICKES, S.**
Captain development training at US Air p 196 N85-18012
- FILATOVA, R. S.**
An electron microscopic and cytochemical investigation of blood lymphocyte subpopulations in association with corticosteroid deficiency p 169 A85-23310
- FILIMONOV, G. P.**
Computer tomography of alveococcosis in the liver p 180 A85-23222
- FILIPPOV, A. K.**
An optical study of electromechanical coupling in heart fibers p 167 A85-23256
- FLIGG**
Sector suite man-machine functional capabilities and performance requirements
[AD-A148881] p 207 N85-19647
- FLORY, D.**
Abiotic synthesis of purines and other heterocyclic compounds by the action of electrical discharges p 211 A85-23868
- FORMALSKII, A. M.**
Force feedback in a manipulator control system p 205 A85-25584
- FORMAN, S. A.**
Morbidity and mortality associated with exposure to Otto Fuel II in the U.S. Navy 1966-1979
[AD-A148726] p 185 N85-18574
- FOSTER, F.**
Simulation p 197 N85-18024
- FRANK, L. H.**
Simulator sickness: Sensorimotor disturbances induced in flight simulators
[AD-P004334] p 184 N85-17988
- FREGLY, M. J.**
Angiotensin II - Induced hypothermia in rats p 171 A85-25707
- FRY, R. J. M.**
Approaches to radiation guidelines for space travel
[DE85-001248] p 186 N85-18576
- FULCO, C. S.**
Hemodynamics responses to upright tilt at sea level and high altitude
[AD-A148848] p 189 N85-19634
- G**
- GABAIN, L. I.**
The relief characteristics of the internal surface of the cardiac ventricles and Viessen-Thebesian vessels p 180 A85-23238
- GAIDAI, B. V.**
Optimization of pilot-retraining programs with allowance for the individual qualities of the pilots p 204 A85-24038

GRABOVSKII, L. A.

- GALEY, W. R.**
The effect of inert gases on ion transport across the erythrocyte membrane
[AD-A148889] p 189 N85-19635
- GALIAVICH, A. S.**
Amplitude characteristics of the electric field of the heart p 181 A85-23262
- GALLUSCIO, E. H.**
Multiple resources and brain laterality
[AD-A148912] p 199 N85-19643
- GANDELSMAN, A. B.**
The integration of motor and vegetative functions during muscular work p 183 A85-25645
- GARALENE, V. N.**
The effect of isatin and its derivatives on certain indices of carbohydrate metabolism p 168 A85-23295
- GARDINER, W. P.**
Closed-loop concepts for the Army: Water conservation, recycle, and reuse
[AD-A148839] p 207 N85-18581
- GARIBASHVILI, R. N.**
Computer tomography of alveococcosis in the liver p 180 A85-23222
- GARIN, N. S.**
Promising methods for early laboratory diagnosis of infectious diseases p 183 A85-25619
- GENETTI, M. G.**
Crewstation assessment of reach as applied to the OH-58A helicopter
[AD-A149413] p 208 N85-19650
- GERASIMOV, A. M.**
Change in the response of the heart to posthypoxic reoxygenation after injection of superoxide dismutase and its inhibitor p 171 A85-25617
- GERASIMOV, B. M.**
Simulation model for assessing the combined effect of engineering and psychological factors on the efficiency of a man-machine system p 203 A85-24036
- GERASIMOVA, M. M.**
Efficiency of the treatment of patients with vibration sickness by means of sinusoidal modulated currents p 179 A85-23212
- Modulated sinusoidal currents in management of vibration sickness** p 187 N85-19612
- GERMAN, G. P.**
Structural studies of human IgA1 and IgA2 immunoglobulins tagged with two different spin-labels p 181 A85-23251
- GERONE, P. J.**
Biomechanical studies of impact acceleration research
[AD-A149077] p 176 N85-19601
- GEVINS, A. S.**
Neurocognitive pattern analysis of an auditory and visual numeric motor control task. Part 1: Development of methods
[AD-A148809] p 198 N85-18578
- GIBADULIN, T. V.**
General features of sensory processes under the effects of extreme stimuli p 171 A85-25644
- GIBSON, C. J.**
Tyrosine administration enhances dopamine synthesis and release in light-activated rat retina p 170 A85-24500
- GILL, P. H. R.**
USAFSAM integration laboratory assessments of the Advanced Chemical Defence Aircrew Respirator (ACDAR) p 200 A85-22756
- GLAZKOVA, V. A.**
A method for controlling the state of an operator in conditions of complex activity p 190 A85-23156
- GLAZNIKOV, L. A.**
Specifics of human thermal regulatory reactions upon exposure to coriolis acceleration p 187 N85-19617
- GOLEGO, V. N.**
Simulation of pilot activity on the basis of onboard-recorder data p 203 A85-24034
- GOLIKOV, P. P.**
Specific glucocorticoid receptors of human muscle cytosol p 182 A85-23309
- GOLUBEV, V. N.**
General features of sensory processes under the effects of extreme stimuli p 171 A85-25644
- GONCHAR, I. G.**
A comparative evaluation of various methods for the treatment of miners with vibration-induced and noise-induced pathologies p 179 A85-23207
- Comparative assessment of different treatment modalities in miners with vibration- and noise-induced disease p 186 N85-19610
- GOSUDAREV, N. A.**
Methods of monitoring mental work efficiency, emotional activity p 199 N85-19627
- GRABOVSKII, L. A.**
An investigation of the isovolumic indices of myocardial contractility in response to directed changes in heart function p 173 A85-26257

- GRAHAM, J., JR.**
Tactical fighter aircraft training
[SAE PAPER 841587] p 196 A85-25985
- GREENBAUM, E.**
Artificial photosynthesis with algal and reconstituted systems
[DE85-002557] p 176 N85-19604
- GRIGORIAN, A. G.**
Physiological characterization of the work of the operating personnel of a power system in an arid zone p 179 A85-23219
- GRIGORYAN, A. G.**
Work physiology of operating personnel at power plants in arid regions p 207 N85-19606
- GRIMAK, L. P.**
Some principles for the construction of an adaptive training system p 192 A85-23279
- GRISHANOVA, A. IU.**
Effect of methylmethacrylate and acrylamide on the microsomal oxidation system in the rat liver p 168 A85-23294
- GRISHCHENKO, L. A.**
A comparative evaluation of various methods for the treatment of miners with vibration-induced and noise-induced pathologies p 179 A85-23207
- Comparative assessment of different treatment modalities in miners with vibration and noise-induced disease p 186 N85-19610
- GROSSBERG, S.**
Neural dynamics of brightness perception - Features, boundaries, diffusion, and resonance p 195 A85-25789
- GROWER, R. G.**
T-45 training system - Concept and acquisition strategy
[SAE PAPER 841588] p 205 A85-25986
- GRUZOV, M. A.**
An electron microscopic and cytochemical investigation of blood lymphocyte subpopulations in association with corticosteroid deficiency p 169 A85-23310
- GUBANOV, N. I.**
Spatial localization and projection of sensory images p 193 A85-23314
- GUILL, F. C.**
U.S. Navy aviation mishap aircrew anthropometry - 1 January 1969 through 31 December 1979 p 201 A85-22775
- Factors influencing the incidence and severity of 'ejection associated' neck injuries sustained by U.S. Navy ejectionees 1 January 1969 through 31 December 1979 - A preliminary report p 177 A85-22776
- GUREVICH, V. I.**
Drop in nervous-system load as a risk factor in the development of myocardial infarction p 182 A85-25618
- GURFINKEL, V. S.**
Force feedback in a manipulator control system p 205 A85-25584
- GUSEV, A. N.**
The mechanism of variations in erythrocyte electrophoretic mobility in response the UHF irradiation p 167 A85-23254
- GUTMAN, S. R.**
Prospects for the use of models of autoregression-sliding mean type for EEG analysis p 182 A85-23306
- H**
- HALL, E. J.**
Radiation physics, biophysics, and radiation biology [DE84-014885] p 174 N85-18557
- HANDS, J.**
Suspended animation for space flight p 172 A85-25832
- HARDING, S. K.**
Man-machine interaction: Operator [AD-A149075] p 207 N85-19648
- HARI, R.**
The physical basis for the generation of neuromagnetic fields p 174 A85-26298
- HARRIS, C. R.**
Genetic effects of microwave exposure on mammalian cells in vitro. Volume 2, Appendix A: Cytogenetics and growth kinetics data, 850 MHz [AD-A148866] p 175 N85-19599
- Genetic effects of microwave exposure on mammalian cells in vitro. Volume 2, Appendix B: Cytogenetics and growth kinetics data, 1.2 GHz [AD-A148867] p 176 N85-19600
- Genetic effects of microwave exposure on mammalian cells in vitro, volume 2 [AD-A149347] p 176 N85-19603
- HARRISON, F. W.**
A system-level approach to automation research p 202 A85-23197
- HART, S. G.**
Pilot workload, performance and aircraft control automation p 210 N85-19670
- HARTZELL, E. J.**
Aircraft-aircrew integration issues in future US Army helicopters p 210 N85-19672
- HAWKINS, J. M.**
Immersion suits, past and present p 201 A85-22771
- HEATH, M. E.**
Effect of cutaneous denervation of face and trunk on thermoregulatory responses to cold in rats p 171 A85-25701
- HEGSTROM, R. A.**
New estimates of asymmetric decomposition of racemic mixtures by natural beta-radiation sources p 211 A85-24440
- HELDT, P. H.**
The man in the cockpit of a modern commercial aircraft p 205 A85-25511
- HELMKAMP, J. C.**
Morbidity and mortality associated with exposure to Otto Fuel II in the U.S. Navy 1966-1979 [AD-A148726] p 185 N85-18574
- HEROLD, W.**
The muscle as a system of parametric excitation p 167 A85-23257
- HERTZBERG, R.**
Health assessment document for carbon tetrachloride [PB85-124196] p 190 N85-19638
- HILL, T. L.**
Muscle contraction and free energy transduction in biological systems p 172 A85-25822
- HINGOHER-SZALKAY, H.**
Gravity and biological systems: Emphasis on human physiology [ESA-BR-21] p 174 N85-18558
- HITCHCOCK, R. J.**
Influence of a perspective cockpit traffic display format on pilot avoidance maneuvers p 210 N85-19668
- HODGSON, V. R.**
Improving head crash protection p 201 A85-22770
- HUFF, F.**
Closed-loop concepts for the Army: Water conservation, recycle, and reuse [AD-A148839] p 207 N85-18581
- HUNTSMAN, B. W.**
Heat stress and personal protective equipment [DE85-003552] p 208 N85-19652
- I**
- IAKOVLEV, V. M.**
Experimental atherosclerosis in middle-altitude conditions p 165 A85-23201
- IVARLEKHTO, T.**
The effect of a task on human skin mechanoreceptor response p 192 A85-23284
- IGNATOVA, N. V.**
The hemodynamics of various stages of nighttime sleep in patients with preliminary symptoms of cerebral hemodynamic deficiency p 180 A85-23248
- ILIN, V. N.**
Methodological aspects of the problem of neurohumoral regulation and their implications for the cognition of pain mechanisms p 173 A85-26255
- ILMONIEMI, R.**
The physical basis for the generation of neuromagnetic fields p 174 A85-26298
- IMSHENETSKIY, A. A.**
Growth of soil bacteria in presence of Martian soil analog, carbon dioxide and hydrogen peroxide p 175 N85-18560
- ITIHARA, Y.**
Ammonium contents of biotites from Precambrian rocks in Finland - The significance of NH4(+) as a possible chemical fossil p 212 A85-25839
- IUDINA, L. E.**
The use of enzymes to correct the immune response under vibration loading p 165 A85-23215
- IUSHKOVA, L. A.**
Some methodological approaches to predicting the functional state of the body associated with hazardous environmental factors p 167 A85-23268
- IVANOV, D. S.**
Methodical approaches to determination of sanitation protective zone dimensions around TV centers and TV retransmitters p 185 N85-18563
- IVANOV, E. A.**
Adaptivity of the eye-hand system of a human operator p 190 A85-23154
- IVANOV, V. V.**
Effect of methylmethacrylate and acrylamide on the microsomal oxidation system in the rat liver p 168 A85-23294
- Prevention measures for the adverse effects of vibration p 183 A85-25620
- J**
- JAMESON, R. C.**
Life Support System Program Office - 1983 corporate report p 201 A85-22761
- JENNINGS, D. B.**
Ventilation and acid-base balance in awake dogs exposed to heat and CO₂ p 172 A85-25709
- JONES**
Sector suite man-machine functional capabilities and performance requirements [AD-A148881] p 207 N85-19647
- JUKES, T. H.**
Evolutionary constraints and the neutral theory p 170 A85-23870
- K**
- KADEN, E.**
Boundary conditions of work place design in flight operation p 205 A85-25514
- KAEVITSER, I. M.**
An investigation of the cerebral hemodynamics of workers exposed to industrial noise p 181 A85-23265
- KAKHNOVER, N. B.**
Redox processes in the rat myocardium under acute hypoxia p 172 A85-26251
- KALNISH, V. V.**
Work capacity of heat and electric power plant operations working 12 hour day and night shifts p 206 N85-18567
- KAMENSKII, IU. N.**
Effect of total-body vibration and noise on the functional state of human operators p 179 A85-23211
- KAMENSKIY, Y. N.**
Effects of overall vibration and noise on operational personnel p 207 N85-19608
- KAPLUNOVA, O. A.**
The morphofunctional characteristics of intraorgan arterial vessels in the kidney in the normal state and in certain cardiovascular diseases p 180 A85-23239
- KARACHEV, I. I.**
Methodical approaches to determination of sanitation protective zone dimensions around TV centers and TV retransmitters p 185 N85-18563
- KARGAPOLOV, A. V.**
Changes in the composition of mitochondrial lipids in the presence of dinitrophenol under hypoxic conditions p 168 A85-23291
- KARBITSKII, V. V.**
Status of the kallikrein-kinin system in blood from the cardiac ventricles in the development dynamics of spontaneous hypertension in rats p 169 A85-23298
- KARPMAN, V. L.**
Maximal blood-circulation modes p 183 A85-25648
- KARPOV, A. P.**
Significance of ultrasonic echo studies for human anatomy p 180 A85-23240
- KARPOVICH, G. A.**
Change in ornithine carbamoyltransferase activity in rats after X-ray irradiation and the administration of a vitamin-coenzyme complex p 170 A85-24206
- KASIANOVA, T. I.**
Investigation of the dynamics of the automicrflora of the skin and fauces, and the bacterial contamination of the underclothes of mine workers p 202 A85-23273
- KATKOV, V. F.**
The pharmacological correction of fatigue p 169 A85-23725
- KAWAGUCHI, M.**
A mathematical model of visual perception regarding peripheral vision and its application to the Hermann's illusion p 195 A85-25199
- KELLOGG, R. S.**
Simulator sickness: Sensorimotor disturbances induced in flight simulators [AD-P004334] p 184 N85-17988
- KELLY, D. H.**
Visual processing of moving stimuli p 193 A85-24383
- KENNEDY, R. S.**
Simulator sickness: Sensorimotor disturbances induced in flight simulators [AD-P004334] p 184 N85-17988
- KHARICHENKO, N. K.**
Specific differences and seasonal fluctuations in blood serum enzyme activity in experimental animals p 172 A85-26252

PERSONAL AUTHOR INDEX

LETAW, J. R.

KHARITONOV, S. A.

A comparative evaluation of various methods for the treatment of miners with vibration-induced and noise-induced pathologies p 179 A85-23207

Comparative assessment of different treatment modalities in miners with vibration- and noise-induced disease p 186 N85-19610

KHMELEVSKII, IU. V.

Redox processes in the rat myocardium under acute hypoxia p 172 A85-26251

KHODASEVICH, L. S.

Endocrine structure of the kidneys in hypertensive disease p 181 A85-23263

KHODYREVA, A. F.

Changes in the composition of mitochondrial lipids in the presence of dinitrophenol under hypoxic conditions p 168 A85-23291

KHODZHAEVA, D. K.

Amplitude characteristics of the electric field of the heart p 181 A85-23262

KHOMENKO, B. M.

An electron microscopic and cytochemical investigation of blood lymphocyte subpopulations in association with corticosteroid deficiency p 169 A85-23310

KHVESTOV, K. A.

Interpersonal activity in conditions of group learning p 192 A85-23278

KIM, V. V.

The integration of motor and vegetative functions during muscular work p 183 A85-25645

KIMURA, M.

Evolutionary constraints and the neutral theory p 170 A85-23870

KIRICHENKO, N. B.

Effect of a low-frequency alternating magnetic field on the course of pyrogenic fever p 165 A85-23202

KLIMOVA, K. N.

Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 1: Expression of ABO and Rhesus system antigen p 175 N85-18564

KLINKOVSKAIA, E. V.

Noise protection of workers in the sawmill and wood-processing industry p 179 A85-23216

KLOSTER

Sector suite man-machine functional capabilities and performance requirements
[AD-A148881] p 207 N85-19647

KOBRIN, V. I.

The role of mitochondria in the regulation of Ca(2+) transmembrane current in myocardial cells p 173 A85-26285

KOBUS, D. A.

The relative effectiveness of red and white light for subsequent dark-adaptation
[AD-A148883] p 199 N85-19642

KOCH, C.

Selecting one among the many: A simple network implementing shifts in selective visual attention
[AD-A148989] p 199 N85-19644

KOCHERGIN, S. M.

Hygienic standards for electromagnetic radiation in the home p 168 A85-23269

KOCHETENKO, T. E.

Changes in central hemodynamic parameters under the influence of volume loading in a healthy state, and during experimental myocardial infarction p 173 A85-26258

KODRIANU, I. G.

Methodological problems of man-machine interaction in the solution of mathematical problems p 202 A85-23315

KOEHL, F.

Observations of physiological and psychological effects of terrain following flight based on in-flight test experience p 209 N85-19657

KOENDERINK, J. J.

Spatial and temporal parameters of motion detection in the peripheral visual field p 193 A85-24387

KOLBANOV, V. V.

General features of sensory processes under the effects of extreme stimuli p 171 A85-25644

KOLCHNEKO, N. V.

Determination of functional mobility of human nervous system with the PNN-3 instrument p 187 N85-19618

KOLMAKOV, V. N.

Effect of low-frequency acoustic oscillations and certain erythrocyte membrane components in vitro p 165 A85-23218

KOLOSKOV, IU. B.

Change in the response of the heart to posthypoxic reoxygenation after injection of superoxide dismutase and its inhibitor p 171 A85-25617

KOLOTYGINA, I. M.

Cell surface RNA - A possible molecular receptor for adaptogens p 166 A85-23252

KOMISSAROVA, E. N.

The structural characteristics of the metacarpal bones of athletes practising a variety of sports p 180 A85-23236

KONDORSKII, E. I.

Magnetic susceptibility and the magnetic capture of cells p 167 A85-23253

KONOVALOVA, S. I.

A comparative evaluation of various methods for the treatment of miners with vibration-induced and noise-induced pathologies p 179 A85-23207

Comparative assessment of different treatment modalities in miners with vibration- and noise-induced disease p 186 N85-19610

KORDIUM, E. L.

Activation and localization of transport ATPase in cells of pea-seedling roots in hypogravity conditions p 169 A85-23305

KORENEV, A. N.

Panoramic vision and its applications p 192 A85-23277

KORNITSKAI, A. I.

Redox processes in the rat myocardium under acute hypoxia p 172 A85-26251

KOROTEEV, V. A.

Simulation of pilot activity on the basis of onboard-recorder data p 203 A85-24034

KOROVKIN, B. F.

Effect of lethal and superlethal doses of gamma radiation on the activity of lysosomal enzymes in radio-sensitive and radio-resistant rat tissues p 168 A85-23297

KOSLESNIKOVA, A. V.

Study of bodily functional status and quality of controlling action of power unit operators with various intensities of labor p 206 N85-18569

KOSOUROV, A. K.

Certain conclusions and prospects of study pertaining to the vascular system in the case of limitations on motor activity p 166 A85-23232

Significance of ultrasonic echo studies for human anatomy

p 180 A85-23240

KOTLOVSKII, IU. V.

Effect of methylmethacrylate and acrylamide on the microsomal oxidation system in the rat liver p 168 A85-23294

KOVALEVA, N. I.

Application of active oculography and electroneuromyography to analyze the effect of drugs p 178 A85-23165

KOWLER, E.

Smooth pursuit of small-amplitude sinusoidal motion p 193 A85-24385

KOZLOV, O. IU.

Investigation of the dynamics of the automicr flora of the skin and fauces, and the bacterial contamination of the underclothes of mine workers p 202 A85-23273

KRASIU, A. N.

Changes in redox processes in rats with anemia due to alkylating preparations in alpine climatic conditions p 172 A85-26253

KRAVCHENKO, V. I.

An electron microscopic and cytochemical investigation of blood lymphocyte subpopulations in association with corticosteroid deficiency p 169 A85-23310

KROL, V. M.

Restructuring of the process of visual recognition as perception conditions alter p 199 N85-19624

KRUGLIKOV, R. I.

Redundancy as a principle of the programming activity of the brain p 169 A85-23303

KRULWICH, T. A.

Respiratory chain of alkalophilic bacteria
[DE84-012558] p 174 N85-18556

KRUPNOV, A. I.

An investigation of the psychological aspects of individual manifestations of sociability in humans p 192 A85-23281

KRUTZ, R. W., JR.

A computer model for prediction of pilot performance based on the addition of different weights at various locations on the head p 201 A85-22772

KUDRIN, A. N.

Hematological complications of drug therapy p 180 A85-23223

KUIMOVA, T. L.

Experience with the early diagnosis and prevention of the vibration sickness of construction workers p 181 A85-23271

KUKHTINA, G. V.

A comparative evaluation of various methods for the treatment of miners with vibration-induced and noise-induced pathologies p 179 A85-23207

Comparative assessment of different treatment modalities in miners with vibration- and noise-induced disease p 186 N85-19610

KULAGIN, V. I.

Experience with a centralized provision for individual radiation-dose monitoring p 202 A85-23270

KULACHEV, A. P.

Dialog system of preparation and presentation of visual information p 198 N85-19622

KUPRIIANOVA, T. S.

Efficiency of the treatment of patients with vibration sickness by means of sinusoidal modulated currents p 179 A85-23212

KUPRIYANOVA, T. S.

Modulated sinusoidal currents in management of vibration sickness p 187 N85-19612

KUZMENKO, I. V.

Redox processes in the rat myocardium under acute hypoxia p 172 A85-26251

KUZMENKO, V. A.

Responses of people to heat load in saunas p 178 A85-23203

KUZMICHEVA, N. A.

Investigation of the total activity and distribution of multiple forms of a number of lysosomal glycosidases in subfractions of human leukocytes p 182 A85-23296

KUZOVKOV, A. G.

General features of sensory processes under the effects of extreme stimuli p 171 A85-25644

L

LAESSIG, P.

The muscle as a system of parametric excitation p 167 A85-23257

LARICHEVA, N. I.

Specific differences and seasonal fluctuations in blood serum enzyme activity in experimental animals p 172 A85-26252

LARIN, I. V.

A method for comparing the simple sensorimotor responses of interacting operators p 202 A85-23166

LARIONOVA, N. A.

Gravitational adaptation in forest trees p 166 A85-23224

LASLEY, R. D.

Chronic exercise and left ventricular structure and function in healthy human subjects p 184 A85-25703

LASTOVCHENKO, V. B.

Work capacity of heat and electric power plant operations working 12 hour day and night shifts p 206 N85-18567

LATASH, L. P.

Psychophysiological methods for the assessment of the state of a human operator during the controlled effect of ethanol p 178 A85-23157

LAUGHLIN, M. H.

Effects of exercise training on coronary transport capacity p 171 A85-25705

LAVENTEV, G. A.

The effect of silicates on the thermal stability of amino acids p 211 A85-25568

LAVENTEV, V. V.

Structural studies of human IgA1 and IgA2 immunoglobulins tagged with two different spin-labels p 181 A85-23251

LAWVER, J.

Dynamic training devices in CRM training p 197 N85-18018

Low cost training aids and devices

p 197 N85-18025

LE THAI HUYEN

Reinforcement Kevlar or fiberglass in the HGU helmet shell p 201 A85-22763

LEBEDINSKII, V. A.

Promising methods for early laboratory diagnosis of infectious diseases p 183 A85-25619

LEE, A.

Low cost training aids and devices p 197 N85-18025

LEE, A. T.

Low-cost training technology p 196 N85-18011

LEHMKUHLE, S.

Meridional anisotropy of spatial displacement detection p 195 A85-25791

LENOROVITZ

Sector suite man-machine functional capabilities and performance requirements
[AD-A148881] p 207 N85-19647

LENSKII, A. V.

Force feedback in a manipulator control system p 205 A85-25584

LETAW, J. R.

Radiation doses and biological effects of cosmic rays p 165 A85-22853

LEVINE, L.

Skeletal muscle metabolism during exercise is influenced by heat acclimation
[AD-A148845] p 188 N85-19632

LEVINSON, J. Z.

Vision in the presence of known natural retinal image motion p 193 A85-24384
Receptive-field symmetry probed using converging gratings p 194 A85-24389

LIMANSKII, IU. P.

Methodological aspects of the problem of neurohumoral regulation and their implications for the cognition of pain mechanisms p 173 A85-26255

LINDSAY, L. G.

Epinephrine is unessential for stimulation of liver glycogenolysis during exercise p 172 A85-25708

LIPKINA, L. I.

Study of bodily functional status and quality of controlling action of power unit operators with various intensities of labor p 206 N85-18569

LISSOVA, O. I.

Changes in central hemodynamic parameters under the influence of volume loading in a healthy state, and during experimental myocardial infarction p 173 A85-26258

LIVANOV, M. N.

Psychological aspects of the phenomenon of spatial synchronization of potentials p 192 A85-23280

LOSEV, S. S.

The pharmacological correction of fatigue p 169 A85-23725

LOSEVA, M. I.

The correction of microcirculatory disorders from vibrational illness p 179 A85-23208
Management of microcirculatory disorders in vibration sickness p 186 N85-19611

LOZHIN, G. V.

Automation of an investigation procedure using a 16-factor personality questionnaire p 192 A85-23286
Simulation model for assessing the combined effect of engineering and psychological factors on the efficiency of a man-machine system p 203 A85-24036

LUCHIKHIN, L. A.

The age-related aspects of vestibular function in patients with chronic purulent otitis media according to cupulometry data p 181 A85-23264

LUCHKO, L. N.

A method for studying work activities p 191 A85-23231

LUGOVSKII, V. K.

Some methodological approaches to predicting the functional state of the body associated with hazardous environmental factors p 167 A85-23268

LURIA, S. M.

Effect of extreme peripheral light on dark adaptation [AD-A148923] p 189 N85-19636
Individual differences in chromatic brightness matching [AD-A148882] p 199 N85-19641

The relative effectiveness of red and white light for subsequent dark-adaptation [AD-A148883] p 199 N85-19642

M

MAGALIF, A. IU.

Psychophysiological methods for the assessment of the state of a human operator during the controlled effect of ethanol p 178 A85-23157

MAISURADZE, L. M.

Effects of partial deprivation of slow-wave sleep on sleep-wakefulness cycles p 187 N85-19613

MAKARENKO, N. V.

The basic properties of the nervous system and their role in occupational activity p 196 A85-26256
Determination of functional mobility of human nervous system with the PNN-3 instrument p 187 N85-19618

MAKOVETSKII, V. P.

Redox processes in the rat myocardium under acute hypoxia p 172 A85-26251

MALENKOV, A. G.

Cell surface RNA - A possible molecular receptor for adaptogens p 166 A85-23252

MALINSKII, D. M.

An evaluation of the effectiveness of treatment based on survival rate tables p 182 A85-23299

MALIUGIN, V. N.

Effect of daily routine on the functional state of operators according to heart-rhythm parameters p 177 A85-23153

MALYGIN, V. N.

Temporary endocardial electrocardiostimulation during disturbances of heart rhythm and conduction p 181 A85-23260

MANUKHIN, B. N.

Influence of hyperthermia on body temperature and content of catecholamines in white rat hypothalamus p 176 N85-19615

MARKER, J. C.

Epinephrine is unessential for stimulation of liver glycogenolysis during exercise p 172 A85-25708

MARTIN, D. G.

Blood viscosity responses to acute exercise and aerobic conditioning in women p 185 N85-18573

MARTIN, R. P.

Chronic exercise and left ventricular structure and function in healthy human subjects p 184 A85-25703

MARTINS, A. J.

Smooth pursuit of small-amplitude sinusoidal motion p 193 A85-24385

MASHKOVA, V. M.

Rapid monitoring and prediction of the psychophysiological state of an operator during the simulation of emergency situations p 190 A85-23159

Application of active oculography and electroenervomyography to analyze the effect of drugs p 178 A85-23165

MASKREY, M.

Ventilation and acid-base balance in awake dogs exposed to heat and CO₂ p 172 A85-25709

MASLOVA, K. I.

Effect of an elevated level of natural radioactivity on glycogen content in peripheral-blood leukocytes of Microtus oeconomus Pall p 170 A85-24027

MATERII, L. D.

Effect of an elevated level of natural radioactivity on glycogen content in peripheral-blood leukocytes of Microtus oeconomus Pall p 170 A85-24027

MATUSHIN, I. F.

Fatty acid metabolism in the myocardium under normal conditions and in cardiac disease (Survey) p 168 A85-23290

MATSNEV, A. A.

Temporary endocardial electrocardiostimulation during disturbances of heart rhythm and conduction p 181 A85-23260

MAYDIKOV, Y. L.

Determination of functional mobility of human nervous system with the PNN-3 instrument p 187 N85-19618

MAZHILIS, L. I.

The effect of isatin and its derivatives on certain indices of carbohydrate metabolism p 168 A85-23295

MCCAULEY, M. E.

Simulator sickness: Sensorimotor disturbances induced in flight simulators [AD-P004334] p 184 A85-17988

MCGREEVY, M. W.

Influence of a perspective cockpit traffic display format on pilot avoidance maneuvers p 210 N85-19668

MCKEE, S. P.

Sequential recruitment in the discrimination of velocity p 193 A85-24386

MCNALLY, M. S.

Morbidity and mortality associated with exposure to Otto Fuel II in the U.S. Navy 1966-1979 [AD-A148726] p 185 N85-18574

MEDVEDEV, V. I.

General features of sensory processes under the effects of extreme stimuli p 171 A85-25644

MELESHEV, A. M.

Assessment of the work capacity of ergatic systems p 203 A85-24032

MELNIKOV, E. V.

Optimization of pilot-retraining programs with allowance for the individual qualities of the pilots p 204 A85-24038

MELTZ, M. L.

Genetic effects of microwave exposure on mammalian cells in vitro. Volume 2, Appendix A: Cytogenetics and growth kinetics data, 850 MHz [AD-A148866] p 175 N85-19599

MOZHZEVELOV, S. B.

Genetic effects of microwave exposure on mammalian cells in vitro. Volume 2, Appendix B: Cytogenetics and growth kinetics data, 1.2 GHz [AD-A148867] p 176 N85-19600

MENDENHALL, J.

Genetic effects of microwave exposure on mammalian cells in vitro, volume 2 [AD-A149347] p 176 N85-19603

MENSHOV, A. A.

Influence of G-suit abdominal bladder inflation on gas exchange during +Gz stress p 171 A85-25706

MENU, J. P.

Dose assessment of noise load on tractor operators in agriculture p 179 A85-23210

MERETSKOV, V. V.

Grasp of information by the pilot in future combat aircraft p 209 N85-19662

MERRIMAN, S. C.

The F-18: A new era for human factors p 210 N85-19671

MERTSALOV, V. S.

The hemodynamics of various stages of nighttime sleep in patients with preliminary symptoms of cerebral hemodynamic deficiency p 180 A85-23248

MEZIDOV, K. A.

Influence of hyperthermia on body temperature and content of catecholamines in white rat hypothalamus p 176 N85-19615

MIGACHEV, S. D.

Prevention measures for the adverse effects of vibration p 183 A85-25620

MIKHALEVA, N. P.

Effect of lethal and superlethal doses of gamma radiation on the activity of lysosomal enzymes in radio-sensitive and radio-resistant rat tissues p 168 A85-23297

MILCHAKOV, V. I.

Change in the response of the heart to posthypoxic reoxygenation after injection of superoxide dismutase and its inhibitor p 171 A85-25617

MINAKOV, V. S.

The function of the adrenal cortex and the ovaries in normal subjects and in patients with iron deficiency anemia from an arid region during adaptation to mountain conditions p 184 A85-26260

MININA, E. G.

Gravitational adaptation in forest trees p 166 A85-23224

MISRA, D. K.

Scattering of electromagnetic waves by human body and its applications p 185 N85-18572

MKRTCHAN, O. Z.

The morphological basis of a 'minimization function' for the nephron epithelium during uniform hyperthermia p 169 A85-23301

MODELL, H. I.

Influence of G-suit abdominal bladder inflation on gas exchange during +Gz stress p 171 A85-25706

MOLCHANOV, V. A.

The dynamics of reflexive operations in productive thinking activity p 191 A85-23227

MOMMADOV, I. M.

Physiological characterization of the work of the operating personnel of a power system in an arid zone p 179 A85-23219

MONCH, V. A.

Work physiology of operating personnel at power plants in arid regions p 207 N85-19606

MONOT, A.

Spatial contrast detection for colour patterns under selective chromatic adaptation p 195 A85-25815

MONTY, R. W.

An evaluation of system quality metrics for hard-copy and soft-copy displays of digital imagery p 204 A85-24301

MOORE, J. P.

The F-18: A new era for human factors p 210 N85-19671

MORGAN, N. H.

Neurocognitive pattern analysis of an auditory and visual numeric motor control task. Part 1: Development of methods [AD-A148809] p 198 N85-18578

MOSS, C. F.

Meridional anisotropy of spatial displacement detection p 195 A85-25791

MOZHZEVELOV, S. B.

Force feedback in a manipulator control system p 205 A85-25584

MURCH, G. M.

Laser optometric assessment of visual display viewability p 200 A85-22590

MURPHY, M.

Innovative approaches to recurrent training p 197 N85-18028

MURZAKOV, B. G.

Growth of soil bacteria in presence of Martian soil analog, carbon dioxide and hydrogen peroxide p 175 N85-18560

N

NAGEL, D. C.

Reduction of display artifacts by random sampling p 204 A85-24291

NALIMOV, V. V.

Probabilistic model of the unconscious - The unconscious as manifestation of a semantic universe p 193 A85-23287

NATELSON, B. H.

The physiology of ultradian rhythms and their role in affecting disease resistance [AD-A148842] p 185 N85-18575

PERSONAL AUTHOR INDEX

RANDLE, R.

- NAVAKATIKYAN, A. O.
Work capacity of heat and electric power plant operations working 12 hour day and night shifts
p 206 N85-18567
- NEKHOROSHEVA, M. A.
A comparative evaluation of various methods for the treatment of miners with vibration-induced and noise-induced pathologies
p 179 A85-23207
- Comparative assessment of different treatment modalities in miners with vibration- and noise-induced disease
p 186 N85-19610
- NEMOV, R. S.
Interpersonal activity in conditions of group learning
p 192 A85-23278
- NERI, D. F.
Individual differences in chromatic brightness matching
[AD-A148882]
p 199 N85-19641
- NESTEROV, V. P.
The connection between the parameters of sodium and potassium distribution and the contractile properties of muscles
p 169 A85-23037
- NEZLIN, R. S.
Structural studies of human IgA1 and IgA2 immunoglobulins tagged with two different spin-labels
p 181 A85-23251
- NIKITIN, M. V.
The effect of hypodynamia on the hemomicrocirculatory bed in rat triceps brachii muscle and its fascia
p 166 A85-23233
- NIKITINA, N. G.
Hygienic standards for electromagnetic radiation in the home
p 168 A85-23269
- NIKITUK, B. A.
Anatomical aspects of the use of computer tomography (Review of the non-Soviet literature)
p 166 A85-23241
- NIKOLAEV, P. P.
A model of a constant color perception pattern for the case of continuous spectral functions
p 184 A85-26296
- NIKOLAEVA, A. I.
Protein synthesis and DNA replication in lymphocytes in an immune response
p 167 A85-23266
- NIKULINA, L. A.
Effect of a low-frequency alternating magnetic field on the course of pyrogenic fever
p 165 A85-23202
- NIZOVTEV, V. P.
An estimate of the efficiency of intrapulmonary gas exchange during muscular work in hypoxic conditions
p 184 A85-26259
- NOON, H.
Innovative approaches to recurrent training
p 197 N85-18028
- NORINA, S. B.
Magnetic susceptibility and the magnetic capture of cells
p 167 A85-23253
- NUSHTAEVA, T. V.
Effect of decimeter-range waves on the aggregation activity of thrombocytes, given different localizations of effects in victims of cerebral insult
p 178 A85-23204
- OERNHAGEN, H.
Hydrogen-oxygen (hydrox) breathing at 1.3MPa
[FOA-C-58015-H1]
p 186 N85-18577
- ONIANI, T. N.
Effects of partial deprivation of slow-wave sleep on sleep-wakefulness cycles
p 187 N85-19613
- ONO, H.
Interaction between saccade and tracking vergence
p 194 A85-24501
- ORIANI, T. N.
The effect of paradoxical sleep deprivation on the learning of the active avoidance reaction
p 173 A85-26261
- ORLANDO, N. E.
A system-level approach to automation research
p 202 A85-23197
- ORO, J.
Abiotic synthesis of purines and other heterocyclic compounds by the action of electrical discharges
p 211 A85-23868
- OSADCHII, P. V.
The mechanism of variations in erythrocyte electrophoretic mobility in response to UHF irradiation
p 167 A85-23254
- OSIPOV, V. A.
Psychophysiological study of visual fatigue and recovery of the initial level of work capacity
p 177 A85-23152
- OVCHINNIKOV, N. D.
Rapid monitoring and prediction of the psychophysiological state of an operator during the simulation of emergency situations
p 190 A85-23159
- YAMADA, T.
A mathematical model of visual perception regarding peripheral vision and its application to the Hermann's illusion
p 195 A85-25199
- PAKHOMONOVA, A. M.
Management of microcirculatory disorders in vibration sickness
p 186 N85-19611
- PAKHOMONOVA, A. M.
The correction of microcirculatory disorders from vibrational illness
p 179 A85-23208
- PALEICHUK, D. I.
Assessment of the work capacity of ergatic systems
p 203 A85-24032
- PALLADINA, T. O.
Activation and localization of transport ATPase in cells of pea-seedling roots in hypogravity conditions
p 169 A85-23305
- PALMER, C.
Smooth pursuit of small-amplitude sinusoidal motion
p 193 A85-24385
- PALTSEV, Y. P.
Study of bodily functional status and quality of controlling action of power unit operators with various intensities of labor
p 206 N85-18569
- PANDOLFI, K. B.
Skeletal muscle metabolism during exercise is influenced by heat acclimation
[AD-A148845]
p 188 N85-19632
- PANFEROV, V. N.
Effect of random perturbations on the controllability domain in ergatic dynamic systems
p 203 A85-24030
- PANTLE, A.
Discontinuity limits for the generation of visual motion aftereffects with sine- and square-wave gratings
p 194 A85-24388
- PARKER, D. E.
Tilt from a head-inverted position produces displacement of visual subjective vertical in the opposite direction
p 195 A85-25790
- PARKHOMENKO, N. V.
Ways to enhance the efficiency of the correction of hypoxic states
p 182 A85-23311
- PARSONS, H. M.
Human factors in robotics
p 202 A85-23198
- PASHCHENKO, A. E.
Free amino acids in the brains of some vertebrates
p 169 A85-23308
- PATRIN, A. F.
The age-related aspects of vestibular function in patients with chronic purulent otitis media according to cupulometry data
p 181 A85-23264
- PATSKINA, S. A.
Changes in central hemodynamic parameters under the influence of volume loading in a healthy state, and during experimental myocardial infarction
p 173 A85-26258
- PATTON, J. F.
Assessment of muscle strength and prediction of lifting capacity in US Army personnel
[AD-A148846]
p 189 N85-19633
- PAUTS, V. M.
Carbohydrate metabolism and acid-base equilibrium in relation to nutrition in persons performing physical and mental work in the Estonian SSR
p 181 A85-23274
- PAVLOV, O. G.
The dynamics of an extremely slow omega-potential and EEG spatial synchronization in the presence of muscle fatigue
p 183 A85-25646
- PAVLOV, V. V.
A mechanism for the effect of noise on the labyrinth
p 165 A85-23209
- Assessment of the work capacity of ergatic systems
p 203 A85-24032
- PAVLOVA, V. M.
Methodical approaches to determination of sanitation protective zone dimensions around TV centers and TV retransmitters
p 185 N85-18563
- PEKHME, A. IA.
Protein metabolism in the muscles following muscular work
p 171 A85-25647
- PERSKI, A.
Central control of cardiovascular adjustments to exercise
p 184 A85-25704
- PETROV, A. A.
An investigation of the isovolumic indices of myocardial contractility in response to directed changes in heart function
p 173 A85-26257
- PETROV, Iu. A.
The dynamics of an extremely slow omega-potential and EEG spatial synchronization in the presence of muscle fatigue
p 183 A85-25646
- PETUKHOV, M. I.
Changes in the composition of mitochondrial lipids in the presence of dinitrophenol under hypoxic conditions
p 168 A85-23291
- PETUKHOV, V. V.
Image of the world and psychological investigation of thinking
p 191 A85-23242
- PHILLIPS
Sector suite man-machine functional capabilities and performance requirements
[AD-A148881]
p 207 N85-19647
- PLEPIS, O. Y.
Specifics of human thermal regulatory reactions upon exposure to coriolis acceleration
p 187 N85-19617
- PLOTNIKOV, R. V.
An optical study of electromechanical coupling in heart fibers
p 167 A85-23256
- PODKLETNOVA, I. M.
Investigation of the functional state of a human operator during the formation of a mental habit
p 191 A85-23161
- POLIANTSEV, V. A.
Psychophysiological study of visual fatigue and recovery of the initial level of work capacity
p 177 A85-23152
- PONOMAREV, V. P.
The integration of motor and vegetative functions during muscular work
p 183 A85-25645
- POPOV, V. V.
Quantitative measurement of human auditory acuity
p 187 N85-19614
- POROTIKOV, V. I.
An optical study of electromechanical coupling in heart fibers
p 167 A85-23256
- PORTNOV, F. G.
A simulation of the regional deposition of air ions in human lungs
p 181 A85-23255
- POSTON, R. L.
Tilt from a head-inverted position produces displacement of visual subjective vertical in the opposite direction
p 195 A85-25790
- POTAPENKO, A.
Be healthy, pilot
p 188 N85-19626
- POZHAROV, V. P.
Ways to enhance the efficiency of the correction of hypoxic states
p 182 A85-23311
- PRIDVOROV, V. S.
Investigation of the goal-directed motions of a human in an unsupported state
p 204 A85-24037
- PRIEST, H. F.
Visual flow and direction of locomotion
p 196 A85-25825
- PRIKLONSKII, I. V.
A comparative evaluation of various methods for the treatment of miners with vibration-induced and noise-induced pathologies
p 179 A85-23207
- PRIKLONSKIY, I. V.
Comparative assessment of different treatment modalities in miners with vibration- and noise-induced disease
p 186 N85-19610
- PRIVES, M. G.
Certain conclusions and prospects of study pertaining to the vascular system in the case of limitations on motor activity
p 166 A85-23232
- Significance of ultrasonic echo studies for human anatomy
p 180 A85-23240
- PRIYEEZZHEVA, L. S.
Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 1: Expression of ABO and Rhesus system antigen
p 175 N85-18564
- PROKOPENKO, L. G.
The use of enzymes to correct the immune response under vibration loading
p 165 A85-23215
- PROKOPEV, V. E.
Nonlinear and parametric resonance in human hearing and sight organs
p 174 A85-26297
- QUINN, P. C.
Meridional anisotropy of spatial displacement detection
p 195 A85-25791
- RAMENDIK, D. M.
Dialog system of preparation and presentation of visual information
p 198 N85-19622
- RANDLE, R.
Simulation
p 197 N85-18024

RASIN, M. S.

The physiological role of adrenergic elements of the hypothalamus in the regulation of the hypothalamo-adenohippophyseal systems of adaptation
p 174 A85-26288

RASULOV, M. M.

Effect of modulated ultrahigh frequency field on behavior and hormone level in female rats under emotional stress
p 175 N85-18562

REEVES

Sector suite man-machine functional capabilities and performance requirements
[AD-A148881] p 207 N85-19647

REEVES, M. E.

Artificial photosynthesis with algal and reconstituted systems
[DE85-002557] p 176 N85-19604

REGAN, D.

Visual responses to vorticity and the neural analysis of optic flow
p 194 A85-24390

REINIKAINEN, K.

The physical basis for the generation of neuromagnetic fields
p 174 A85-26298

REISING, J. M.

The cockpit of the year 2000: How big a step?
p 210 N85-19667

RENTSCHLER, I.

Loss of spatial phase relationships in extrafoveal vision
p 194 A85-24433

REZNIKOV, A. G.

The function of the adrenal cortex and the ovaries in normal subjects and in patients with iron deficiency anemia from an arid region during adaptation to mountain conditions
p 184 A85-26260

REZNIKOVA, L. A.

The function of the adrenal cortex and the ovaries in normal subjects and in patients with iron deficiency anemia from an arid region during adaptation to mountain conditions
p 184 A85-26260

RICH, A.

New estimates of asymmetric decomposition of racemic mixtures by natural beta-radiation sources
p 211 A85-24440

RICHTER, K. D.

Impact of future aircombat characteristics on pilot performance and cockpit design
p 209 N85-19661

RIONDINI, A. R.

Suprathreshold contrast perception at different luminance levels
p 195 A85-25774

ROITRUB, B. A.

Methodological aspects of the problem of neurohumoral regulation and their implications for the cognition of pain mechanisms
p 173 A85-26255

ROOT, R. W.

Simulator sickness: Sensorimotor disturbances induced in flight simulators
[AD-P004334] p 184 N85-17988

ROSENTHAL, S.

Health assessment document for carbon tetrachloride [PB85-124196] p 190 N85-19638

ROSSI, H. H.

Radiation physics, biophysics, and radiation biology [DE84-014885] p 174 N85-18557

ROSSI, M. L.

An overview of medical-biological radiation hazards in earth orbits
[IAF PAPER 83-256] p 203 A85-23811

ROZOVA, K. V.

Ways to enhance the efficiency of the correction of hypoxic states
p 182 A85-23311

RUBIN, S. A.

Muscle and femoral vein temperatures during short-term maximal exercise in heart failure
p 183 A85-25702

RUBTSOV, A. A.

Organization and efficiency of a team-basis method for the prophylactic ultraviolet irradiation of coal miners
p 182 A85-23300

RUDENKO, L. N.

An electron microscopic and cytochemical investigation of blood lymphocyte subpopulations in association with corticosteroid deficiency
p 169 A85-23310

RUMANTSEVA, A. G.

Psychophysiological study of visual fatigue and recovery of the initial level of work capacity
p 177 A85-23152

RYSAKOVA, S. L.

The principles of experimental setup in models of complex human operator activities
p 192 A85-23283

S

SAIDA, S.

Interaction between saccade and tracking vergence
p 194 A85-24501

SAMOYLOVA, K. A.

Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 1: Expression of ABO and Rhesus system antigen
p 175 N85-18564

Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 2: Adsorption of alcyan blue by external premembranous components
p 175 N85-18565

SAMUILOV, V. D.

The photosynthetic apparatus of bacteria as a converter of the energy of light into electrical energy
p 170 A85-24650

SANTUCCI, G.

Grasp of information by the pilot in future combat aircraft
p 209 N85-19662

SAVAYAN, A.

Role of engineering psychology
p 197 N85-18561

SAVITSKII, I. V.

Change in ornithine carbamoyltransferase activity in rats after X-ray irradiation and the administration of a vitamin-coenzyme complex
p 170 A85-24026

SAWKA, M. N.

Skeletal muscle metabolism during exercise is influenced by heat acclimation
[AD-A148845] p 188 N85-19632

SCHACTER, D.

Bioelectrochemistry 2: Membrane phenomena
[AD-A149132] p 176 N85-19602

SCHMIT, V. P.

Changing system and display concepts and their impact on aircrew performance
p 209 N85-19665

SCHUMER, R.

Aircraft noise effects: An inter-disciplinary study of the effect of aircraft noise on man. Part 3: Supplementary analyses of the social-scientific portion of the study on aircraft noise conducted by the DFG
[NASA-TM-75802] p 188 N85-19631

SCHWARTZ, M.

Restraint improvement retrofit program - Objectives and requirements
p 200 A85-22759

SCHWEITZER, A.

Quantum noise and the threshold of hearing
p 170 A85-25043

SEECK, D.

Observations of physiological and psychological effects of terrain following flight based on in-flight test experience
p 209 N85-19657

SELE, M.

Use of airplanes for loft training
p 197 N85-18019

SEMKO, V. V.

Simulation of pilot activity on the basis of onboard-recorder data
p 203 A85-24034

SEREDENKO, M. M.

Ways to enhance the efficiency of the correction of hypoxic states
p 182 A85-23311

SERGIENKO, V. B.

Scintigraphy and emission computer tomography of the head in the diagnosis of intracranial vascular congestion
p 180 A85-23246

SHADRIKOV, V. D.

Interrelationship between learning and development in the process of mastering an occupational activity
p 192 A85-23285

SHAFIKOVA, L. F.

The effect of hypodynamia on the hemomicrocirculatory bed in rat triceps brachii muscle and its fascia
p 166 A85-23233

SHALYGIN, A. N.

Magnetic susceptibility and the magnetic capture of cells
p 167 A85-23253

SHANSKOV, M. A.

The integration of motor and vegetative functions during muscular work
p 183 A85-25645

SHARP, D. S.

Assessment of muscle strength and prediction of lifting capacity in US Army personnel
[AD-A148846] p 189 N85-19633

SHEARER, M.

Communications skills for CRM training
p 197 N85-18017

SHELLOCK, F. G.

Muscle and femoral vein temperatures during short-term maximal exercise in heart failure
p 183 A85-25702

SHERIDAN, T. B.

Pilot workload, performance and aircraft control automation
p 210 N85-19670

SHEVCHENKO, V. F.

Effect of daily routine on the functional state of operators according to heart-rhythm parameters
p 177 A85-23153

The stress index as an index of the work state of an operator
p 178 A85-23164

SHIK, M. L.

The locomotor region of the trucus cerebri and the hypothesis of a locomotor column
p 174 A85-26287

SHIROVA, V. A.

The stress index as an index of the work state of an operator
p 178 A85-23164

SHISHLO, M. A.

Effect of a low-frequency alternating magnetic field on the course of pyrogenic fever
p 165 A85-23202

SHIKLIKOV, V. L.

Interrelationship between learning and development in the process of mastering an occupational activity
p 192 A85-23285

SHKOLOVOI, V. V.

The effect of deficient blood supply in the heart on ATPase systems
p 168 A85-23293

SHLEIKIN, A. G.

Effect of low-frequency acoustic oscillations and certain erythrocyte membrane components in vitro
p 165 A85-23218

SHLIAKHOVENKA, V. S.

An electron microscopic and cytochemical investigation of blood lymphocyte subpopulations in association with corticosteroid deficiency
p 169 A85-23310

SHMIDT, A. B.

A simulation of the regional deposition of air ions in human lungs
p 181 A85-23255

SHNEIDER, A. I.

Force feedback in a manipulator control system
p 205 A85-25584

SHOSTAK, V. I.

General features of sensory processes under the effects of extreme stimuli
p 171 A85-25644

SHIPLEVSKII, E. M.

Some methodological approaches to predicting the functional state of the body associated with hazardous environmental factors
p 167 A85-23268

SHUMOV, A. G.

The evaluation of summary vibration load and some biomedical factors in determining the risk of vibration-induced illness in miners
p 179 A85-23206

SHUSTER, M. A.

An investigation of the cerebral hemodynamics of workers exposed to industrial noise
p 181 A85-23265

SHVYRKOV, V. B.

The effect of a task on human skin mechanoreceptor response
p 192 A85-23284

SIFFORD, J. C.

Management training for cockpit crews at Piedmont flight
p 197 N85-18013

SIGAL, V. L.

The mechanism of variations in erythrocyte electrophoretic mobility in response to UHF irradiation
p 167 A85-23254

SILBERBERG, R.

Radiation doses and biological effects of cosmic rays
p 165 A85-22853

SIVULKA, D. J.

Mercury health effects update: Health issue assessment
[PB85-123925] p 190 N85-19639

SKRYL, S. V.

Simulation model for assessing the combined effect of engineering and psychological factors on the efficiency of a man-machine system
p 203 A85-24036

SLEVUTSKAYA, M. V.

Dialog system of preparation and presentation of visual information
p 198 N85-19622

SLEPOVA, L. V.

Effect of visual features of the stimulus material on the formation of functional units of memory
p 191 A85-23245

SMIRNOV, A. V.

The pharmacological correction of fatigue
p 169 A85-23725

SMIRNOV, V. S.

Promising methods for early laboratory diagnosis of infectious diseases
p 183 A85-25619

SMITH, E. D.

Closed-loop concepts for the Army: Water conservation, recycle, and reuse
[AD-A148839] p 207 N85-18581

SMITH, R.

Mercury health effects update: Health issue assessment
[PB85-123925] p 190 N85-19639

SMOLIAR, V. I.

The effect of an iron deficient diet on the formation of bone tissue
p 168 A85-23275

SMOTHERMON, J. P.

United States Air Force undergraduate pilot training today and tomorrow
[SAE PAPER 841589] p 196 A85-25987

- SMUROVA, T. G.** Change in the response of the heart to posthypoxic reoxygenation after injection of superoxide dismutase and its inhibitor p 171 A85-25617
- SNYDER, H. L.** Human performance evaluations of digital image quality p 200 A85-22592
- An evaluation of system quality metrics for hard-copy and soft-copy displays of digital imagery p 204 A85-24301
- SOBOLEVA, N. P.** A comparative evaluation of various methods for the treatment of miners with vibration-induced and noise-induced pathologies p 179 A85-23207
- Treatment of vibration sickness in coal miners by means of hyperbaric oxygenation p 179 A85-23213
- Management of vibration sickness in coal mines by hyperbaric oxygenation p 186 N85-19609
- Comparative assessment of different treatment modalities in miners with vibration- and noise-induced disease p 186 N85-19610
- SOGA, V. N.** Dose assessment of noise load on tractor operators in agriculture p 179 A85-23210
- SOININEN, K.** The effect of a task on human skin mechanoreceptor response p 192 A85-23284
- SOKOLOV, Y. N.** Variability of cardiac rhythm during information loading p 187 N85-19619
- SOKOVITSEVA, A. V.** The morphofunctional characteristics of intraorgan arterial vessels in the kidney in the normal state and in certain cardiovascular diseases p 180 A85-23239
- SOLODNIKOVA, I. V.** Effect of intragroup favoritism in laboratory and natural conditions p 191 A85-23243
- SOLOGUB, E. B.** The dynamics of an extremely slow omega-potential and EEG spatial synchronization in the presence of muscle fatigue p 183 A85-25646
- SONICH, C.** Health assessment document for carbon tetrachloride [PB85-124196] p 190 N85-19638
- SONNENFELD, G.** Contradictory results in interferon research p 170 A85-24499
- SPASENNIKOV, V. V.** Automation of an investigation procedure using a 16-factor personality questionnaire p 192 A85-23286
- Simulation model for assessing the combined effect of engineering and psychological factors on the efficiency of a man-machine system p 203 A85-24036
- SPERLING, G.** Elaborated Reichardt detectors p 204 A85-24392
- STAKHOVSKAIA, L. V.** The synapsal state associated with moderate craniocerebral trauma p 179 A85-23220
- STANKUS, A. I.** Variability of cardiac rhythm during information loading p 187 N85-19619
- STARIKOVSKAIA, I. M.** An electron microscopic and cytochemical investigation of blood lymphocyte subpopulations in association with corticosteroid deficiency p 169 A85-23310
- STASSINOPoulos, E. G.** An overview of medical-biological radiation hazards in earth orbits [IAF PAPER 83-256] p 203 A85-23811
- STATLER, I. C.** Military pilot ergonomics p 208 N85-19655
- STAUBER, M. C.** An overview of medical-biological radiation hazards in earth orbits [IAF PAPER 83-256] p 203 A85-23811
- STAVITSKII, K. R.** Methods of monitoring mental work efficiency, emotional activity p 199 N85-19627
- STEELE, C. M.** Generation-V dual-Purkinje-image eyetracker p 204 A85-25089
- STEINMAN, R. M.** Vision in the presence of known natural retinal image motion p 193 A85-24384
- STORK, D. G.** Receptive-field symmetry probed using converging gratings p 194 A85-24389
- STRELKOV, IU. K.** A method for studying work activities p 191 A85-23231
- Effect of visual features of the stimulus material on the formation of functional units of memory p 191 A85-23245
- STRIGUNKOVA, T. F.** The effect of silicates on the thermal stability of amino acids p 211 A85-25568
- SUKHAREVSKAIA, T. M.** The correction of microcirculatory disorders from vibrational illness p 179 A85-23208
- SUKHAREVSKAIA, T. M.** Management of microcirculatory disorders in vibration sickness p 186 N85-19611
- SULTANOV, F. F.** Influence of hyperthermia on body temperature and content of catecholamines in white rat hypothalamus p 176 N85-19615
- SUPIN, A. Y.** Quantitative measurement of human auditory acuity p 187 N85-19614
- SUTORMIN, V. A.** The correction of microcirculatory disorders from vibrational illness p 179 A85-23208
- Management of microcirculatory disorders in vibration sickness p 186 N85-19611
- SUVOROV, G. A.** Hygienic standardization of whole-body vibration p 178 A85-23205
- Health standards for general vibration p 186 N85-19607
- SUWA, K.** Ammonium contents of biotites from Precambrian rocks in Finland - The significance of NH4(+) as a possible chemical fossil p 212 A85-25839
- SVETLICHNYI, V. A.** Organization and efficiency of a team-basis method for the prophylactic ultraviolet irradiation of coal miners p 182 A85-23300
- SVIDERSKAIA, N. E.** Psychological aspects of the phenomenon of spatial synchronization of potentials p 192 A85-23280
- SVIDOVYI, V. I.** Effect of low-frequency acoustic oscillations and certain erythrocyte membrane components in vitro p 165 A85-23218
- SVIRIDOV, E. P.** Assessment of functional reserves of an operator in a state of fatigue p 178 A85-23158
- SVISHCHUK, A. A.** Redox processes in the rat myocardium under acute hypoxia p 172 A85-26251
- SWAN, H. J. C.** Muscle and femoral vein temperatures during short-term maximal exercise in heart failure p 183 A85-25702
- SYKULEV, IU. K.** Structural studies of human IgA1 and IgA2 immunoglobulins tagged with two different spin-labels p 181 A85-23251
- T**
- TAIRBEKOV, M. G.** Energy transfer in plants in weightlessness p 170 A85-24193
- TALBOT, J. M.** Research opportunities in human behavior and performance [NASA-CR-175473] p 199 N85-19640
- TAPP, W. N.** The physiology of ultradian rhythms and their role in affecting disease resistance [AD-A148842] p 185 N85-18575
- TARASOV, V. G.** Temporary endocardial electrocardiostimulation during disturbances of heart rhythm and conduction p 181 A85-23260
- TAYLOR, R. M.** Some effects of display format variables on the perception of aircraft spatial orientation p 210 N85-19666
- TEL, E. Z.** The use of acupuncture to correct psychophysiological states in humans p 177 A85-23155
- TERENTYEVA, D. P.** A comparative evaluation of various methods for the treatment of miners with vibration-induced and noise-induced pathologies p 179 A85-23207
- TERENTYEVA, D. P.** Comparative assessment of different treatment modalities in miners with vibration- and noise-induced disease p 186 N85-19610
- TERESHKIN, A. A.** A methodology for determining the parameters of a pilot as an information-processing control system p 203 A85-24033
- TERMOHLEN, J.** Conceptual model of critical requirements for effective pilot performance in high performance aircraft p 209 N85-19663
- TERRY, M. L.** Epinephrine is unessential for stimulation of liver glycogenolysis during exercise p 172 A85-25708
- U**
- ULLMAN, S.** Selecting one among the many: A simple network implementing shifts in selective visual attention [AD-A148989] p 199 N85-19644
- USATENKO, M. S.** Alcohol dehydrogenase in the blood serum of healthy persons and of patients with chronic alcoholism p 182 A85-23292
- UVAROV, V. V.** Scintigraphy and emission computer tomography of the head in the diagnosis of intracranial vascular congestion p 180 A85-23246
- V**
- VALOT, C.** Grasp of information by the pilot in future combat aircraft p 209 N85-19662
- VAN DE GRIND, W. A.** Spatial and temporal parameters of motion detection in the peripheral visual field p 193 A85-24387
- VAN DER STEEN, J.** Vision in the presence of known natural retinal image motion p 193 A85-24384
- VAN DOORN, A. J.** Spatial and temporal parameters of motion detection in the peripheral visual field p 193 A85-24387
- VAN HOUSE, J.** New estimates of asymmetric decomposition of racemic mixtures by natural beta-radiation sources p 211 A85-24440

- VAN SANTEN, J. P. H.**
Elaborated Reichardt detectors p 204 A85-24392
- VANPATTEN, R. E.**
Tolerance, fatigue, physiological and performance effects of sustained and oscillating lateral accelerations p 190 N85-19659
- VARASHKEVICH, S. A.**
Development of a complex of programs of spectral EEG analysis for the operational diagnostics of the functional state of human operators p 178 A85-23163
- VARRIK, E. V.**
Protein metabolism in the muscles following muscular work p 171 A85-25647
- VARTAPETOV, B. A.**
The effect of long-term stress on the hypophyseal-adrenal-gonad systems in rabbits of various ages p 172 A85-26254
- VASILETS, V. M.**
Some principles for the construction of an adaptive training system p 192 A85-23279
- VASILEVA, T. F.**
Objective evaluation of vegetovascular dystonia and psychoemotional disturbances in patients with vibration sickness p 179 A85-23214
- VASILEVSKII, N. N.**
The use of acupuncture to correct psychophysiological states in humans p 177 A85-23155
- VASIUKOVA, E. E.**
Levels of development of the need for cognition p 191 A85-23228
- VASKEVICH, N. N.**
Investigation of the dynamics of the automicoflora of the skin and fauces, and the bacterial contamination of the underclothes of mine workers p 202 A85-23273
- VELSKAIA, M. L.**
A comparative evaluation of various methods for the treatment of miners with vibration-induced and noise-induced pathologies p 179 A85-23207
- VELSKAYA, M. L.**
Comparative assessment of different treatment modalities in miners with vibration- and noise-induced disease p 186 N85-19610
- VERGILES, N. IU.**
Method for the experimental study of visual-motor coordination p 192 A85-23282
- VESELKOV, A. F.**
Extraction of a complex signal from memory p 193 A85-23288
- VIDERSHAIN, G. IA.**
Investigation of the total activity and distribution of multiple forms of a number of lysosomal glycosidases in subfractions of human leukocytes p 182 A85-23296
- VIENOT, F.**
Spatial contrast detection for colour patterns under selective chromatic adaptation p 195 A85-25815
- VINICHUK, S. M.**
The state of the central and cerebral hemodynamics in normal subjects and in patients with incipient cerebral circulation insufficiency p 180 A85-23247
- VINOGRADOV, V. M.**
The pharmacological correction of fatigue p 169 A85-23725
- VIRU, A. A.**
Protein metabolism in the muscles following muscular work p 171 A85-25647
- VOGEL, J. A.**
Assessment of muscle strength and prediction of lifting capacity in US Army personnel |AD-A148846| p 189 N85-19633
- VOLKOV, V. G.**
Methodology and techniques of psychophysiological studies of operator activity p 177 A85-23151
- Rapid monitoring and prediction of the psychophysiological state of an operator during the simulation of emergency situations p 190 A85-23159
- VOLOSHIN, P. V.**
The hemodynamics of various stages of nighttime sleep in patients with preliminary symptoms of cerebral hemodynamic deficiency p 180 A85-23248
- VOLOSHINA, M. S.**
Specific differences and seasonal fluctuations in blood serum enzyme activity in experimental animals p 172 A85-26252
- VOORHEES, J. W.**
Aircr-ae-aircraft integration issues in future US Army helicopters p 210 N85-19672
- VSELIUBSKII, G. A.**
Drop in nervous-system load as a risk factor in the development of myocardial infarction p 182 A85-25618
- VVEDENSKII, V. L.**
The physical basis for the generation of neuromagnetic fields p 174 A85-26298

W

- WALKER, J. M.**
A systems analysis of alternative concepts for aircr-cold weather clothing |AD-A148805| p 206 N85-18580
- WALKER, K. A.**
Genetic effects of microwave exposure on mammalian cells in vitro. Volume 2, Appendix A: Cytogenetics and growth kinetics data, 850 MHz |AD-A148866| p 175 N85-19599
- Genetic effects of microwave exposure on mammalian cells in vitro. Volume 2, Appendix B: Cytogenetics and growth kinetics data, 1.2 GHz |AD-A148867| p 176 N85-19600
- Genetic effects of microwave exposure on mammalian cells in vitro, volume 2 |AD-A149347| p 176 N85-19603
- WALRAVEN, J.**
The colours are not on the display - A survey of non-veridical perceptions that may turn up on a colour display p 195 A85-25814
- WANDELL, B. A.**
Color measurement and discrimination |NASA-CR-3824| p 206 N85-18579
- WANG, T. J.**
Guide to human factors information sources |AD-A149102| p 208 N85-19649
- WATKINS, C. J.**
Tyrosine administration enhances dopamine synthesis and release in light-activated rat retina p 170 A85-24500
- WATSON, A. B.**
Reduction of display artifacts by random sampling p 204 A85-24291
- Model of human visual-motion sensing p 194 A85-24393
- WATSON, D. D.**
Chronic exercise and left ventricular structure and function in healthy human subjects p 184 A85-25703
- WEATHERLY, D.**
Use of simplifier scenarios for CRM training p 197 N85-18016
- WELCH, L.**
Sequential recruitment in the discrimination of velocity p 193 A85-24386
- WICKENS, C. D.**
The multiple resources model of human performance: Implications for display design p 210 N85-19669
- WIERWILLE, W. W.**
Improvement of workload estimation techniques in piloting tasks |NASA-CR-174374| p 207 N85-19646
- WILSON, K. M.**
Angiotensin II - Induced hypothermia in rats p 171 A85-25707
- WILSON, K. T.**
Spacesuit development - The American experience p 202 A85-23123
- WINDER, W. W.**
Epinephrine is unessential for stimulation of liver glycogenolysis during exercise p 172 A85-25708
- WOLFE, L. A.**
Chronic exercise and left ventricular structure and function in healthy human subjects p 184 A85-25703
- WOOD, C. C.**
Electrical sources in human somatosensory cortex Identification by combined magnetic and potential recordings p 184 A85-25824
- WOODWARD, J.**
Artificial photosynthesis with algal and reconstituted systems |DE85-002557| p 176 N85-19604
- WRIGHT, J. E.**
Assessment of muscle strength and prediction of lifting capacity in US Army personnel |AD-A148846| p 189 N85-19633
- WURTMAN, R. J.**
Tyrosine administration enhances dopamine synthesis and release in light-activated rat retina p 170 A85-24500

Y

- YAMANOI, T.**
A mathematical model of visual perception regarding peripheral vision and its application to the Hermann's illusion p 195 A85-25199
- YAMAZAKI, T.**
A mathematical model of visual perception regarding peripheral vision and its application to the Hermann's illusion p 195 A85-25199
- YANG, H. T.**
Epinephrine is unessential for stimulation of liver glycogenolysis during exercise p 172 A85-25708

YARITA, M.

- Electrical sources in human somatosensory cortex Identification by combined magnetic and potential recordings p 184 A85-25824

YELLOTT, J. I., JR.

- Reduction of display artifacts by random sampling p 204 A85-24291

YEVDOKIMOV, M. D.

- Growth of soil bacteria in presence of Martian soil analog, carbon dioxide and hydrogen peroxide p 175 N85-18560

YI, L.

- Beta-decay, Bremsstrahlen, and the origin of molecular chirality p 211 A85-23869

YOCUM, M.

- Video concepts in CRM training p 197 N85-18015

YOUNG, A. J.

- Skeletal muscle metabolism during exercise is influenced by heat acclimation |AD-A148845| p 188 N85-19632

YUASA, S.

- Abiotic synthesis of purines and other heterocyclic compounds by the action of electrical discharges p 211 A85-23868

Z

ZAK, K. P.

- An electron microscopic and cytochemical investigation of blood lymphocyte subpopulations in association with corticosteroid deficiency p 169 A85-23310

ZAMALETDINOV, I. S.

- Some perspectives on the study and improvement of the cognitive-creative activity of an individual and a group p 191 A85-23276

ZARAKOVSKII, G. M.

- The principles of experimental setup in models of complex human operator activities p 192 A85-23283

ZATSEPOLOVA, T. A.

- Hematological complications of drug therapy p 180 A85-23223

ZEMSKOV, V. M.

- Phagocytosis - Physiological and molecular aspects p 167 A85-23267

ZHERNAVKOV, V. F.

- Some principles for the construction of an adaptive training system p 192 A85-23279

ZHIRMUNSKAIA, E. A.

- Prospects for the use of models of autoregression-sliding mean type for EEG analysis p 182 A85-23306

ZHUKOVSKI, L. I.

- Ways to enhance the efficiency of the correction of hypoxic states p 182 A85-23311

ZIMKIN, N. V.

- The variability of functional system structure during physical activity and in the presence of fatigue p 183 A85-25643

ZINGERMAN, A. M.

- The use of acupuncture to correct psychophysiological states in humans p 177 A85-23155

ZLATIN, R. S.

- Methodological aspects of the problem of neurohumoral regulation and their implications for the cognition of pain mechanisms p 173 A85-26255

ZULKARNEEV, R. A.

- Effect of decimeter waves on the relative content of T-lymphocytes in the lymphoid organs p 169 A85-23313

ZVARICH, L. F.

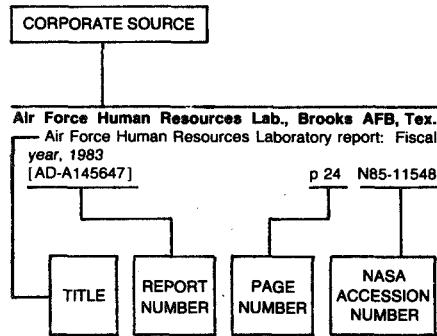
- An estimate of the efficiency of intrapulmonary gas exchange during muscular work in hypoxic conditions p 184 A85-26259

CORPORATE SOURCE INDEX

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Supplement 272)

JUNE 1985

Typical Corporate Source Index Listing



Listings in this index are arranged alphabetically by corporate source. The title of the document is used to provide a brief description of the subject matter. The page number and the accession number are included in each entry to assist the user in locating the abstract in the abstract section. If applicable, a report number is also included as an aid in identifying the document.

A

- Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).**
Human Factors Considerations in High Performance Aircraft
[AGARD-CP-371] p 208 N85-19653
- Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.**
Tolerance, fatigue, physiological and performance effects of sustained and oscillating lateral accelerations
p 190 N85-19659
- Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.**
The cockpit of the year 2000: How big a step?
p 210 N85-19667
- Air Midwest, Inc., Wichita, Kans.**
Communications skills for CRM training
p 197 N85-18017
- Air Wisconsin, Inc., Appleton.**
Use of airplanes for loft training
p 197 N85-18019
- Army Construction Engineering Research Lab., Champaign, Ill.**
Closed-loop concepts for the Army: Water conservation, recycle, and reuse
[AD-A148839] p 207 N85-18581
- Army Natick Research and Development Command, Mass.**
A systems analysis of alternative concepts for aircrew cold weather clothing
[AD-A148805] p 206 N85-18580
- Army Research Inst. Field Unit, Fort Benning, Ga.**
Military pilot ergonomics
p 208 N85-19655
- Army Research Inst. of Environmental Medicine, Natick, Mass.**
Skeletal muscle metabolism during exercise is influenced by heat acclimation
[AD-A148845] p 188 N85-19632
- Assessment of muscle strength and prediction of lifting capacity in US Army personnel
[AD-A148846] p 189 N85-19633

D

- Defence Centre for Leadership, Copenhagen (Denmark).**
Conceptual model of critical requirements for effective pilot performance in high performance aircraft
p 209 N85-19663
- Department of the Air Force, Wright-Patterson AFB, Ohio.**
Implications of guidance and control technology on human factors considerations
[AD-D011468] p 208 N85-19656
- Department of the Navy, Washington, D.C.**
Servo operated anti-G suit pressurization system
[AD-A148839] p 207 N85-18581

E

- Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.**
Heat stress and personal protective equipment
[DE85-003552] p 208 N85-19652
- EEG Systems Lab., San Francisco, Calif.**
Neurocognitive pattern analysis of an auditory and visual numeric motor control task. Part 1: Development of methods
[AD-A148809] p 198 N85-18578
- Environmental Protection Agency, Cincinnati, Ohio.**
Health assessment document for carbon tetrachloride
[PB85-124196] p 190 N85-19638

S
O
U
R
C
E

F

- Federal Aviation Administration, Washington, D.C.**
Medically disqualifying airline pilots
[AD-A149454] p 189 N85-19637
- Federation of American Societies for Experimental Biology, Bethesda, Md.**
Research opportunities in human behavior and performance
[NASA-CR-175473] p 199 N85-19640

G

- Grumman Aerospace Corp., Bethpage, N.Y.**
An overview of medical-biological radiation hazards in earth orbits
[IAF PAPER 83-256] p 203 A85-23811

H

- Houston Univ., Tex.**
Abiotic synthesis of purines and other heterocyclic compounds by the action of electrical discharges
p 211 A85-23868
- Human Engineering Labs., Aberdeen Proving Ground, Md.**
Guide to human factors information sources
[AD-A149102] p 208 N85-19649

I

- Illinois Univ., Urbana-Champaign.**
The multiple resources model of human performance: Implications for display design
[JPRS-UBB-85-002] p 210 N85-19669

J

- Joint Publications Research Service, Arlington, Va.**
USSR report: Life sciences. Biomedical and behavioral sciences
[JPRS-UBB-85-002] p 174 N85-18559
- Growth of soil bacteria in presence of Martian soil analog, carbon dioxide and hydrogen peroxide**
[JPRS-UBB-85-002] p 175 N85-18560
- Role of engineering psychology**
[JPRS-UBB-85-002] p 197 N85-18561
- Effect of modulated ultrahigh frequency field on behavior and hormone level in female rats under emotional stress**
[JPRS-UBB-85-002] p 175 N85-18562
- Methodical approaches to determination of sanitation protective zone dimensions around TV centers and TV transmitters**
[JPRS-UBB-85-002] p 185 N85-18563
- Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 1: Expression of ABO and Rhesus system antigen**
[JPRS-UBB-85-002] p 175 N85-18564
- Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 2: Adsorption of alcyan blue by external premembranous components**
[JPRS-UBB-85-002] p 175 N85-18565
- USSR report: Life sciences. Biomedical and behavioral sciences**
[JPRS-UBB-85-007] p 175 N85-18566
- Work capacity of heat and electric power plant operations working 12 hour day and night shifts**
[JPRS-UBB-85-007] p 206 N85-18567

Louisville Univ., Ky.

Success in learning occupation of chemical production technician as function of certain personality traits and development of psychophysiological functions
p 206 N85-18568

Study of bodily functional status and quality of controlling action of power unit operators with various intensities of labor
p 206 N85-18569

Problems of psychological support of automated organization control systems
p 197 N85-18570

Problems of psychological support of automated organization control systems
p 198 N85-18571

USSR report: Life sciences. Biomedical and behavioral sciences
[JPRS-UBB-85-008] p 176 N85-19605

Work physiology of operating personnel at power plants in arid regions
p 207 N85-19606

Health standards for general vibration
p 186 N85-19607

Effects of overall vibration and noise on operational personnel
p 207 N85-19608

Management of vibration sickness in coal miners by hyperbaric oxygenation
p 186 N85-19609

Comparative assessment of different treatment modalities in miners with vibration- and noise-induced disease
p 186 N85-19610

Management of microcirculatory disorders in vibration sickness
p 186 N85-19611

Modulated sinusoidal currents in management of vibration sickness
p 187 N85-19612

Effects of partial deprivation of slow-wave sleep on sleep-wakefulness cycles
p 187 N85-19613

Quantitative measurement of human auditory acuity
p 187 N85-19614

Influence of hyperthermia on body temperature and content of catecholamines in white rat hypothalamus
p 176 N85-19615

USSR report: Life sciences. Biomedical and behavioral sciences
[JPRS-UBB-85-011] p 177 N85-19616

Specifics of human thermal regulatory reactions upon exposure to coriolis acceleration
p 187 N85-19617

Determination of functional mobility of human nervous system with the PNN-3 instrument
p 187 N85-19618

Variability of cardiac rhythm during information loading
p 187 N85-19619

Study of cognitive styles of students in automated teaching system
p 198 N85-19620

Functional role of type of person's temperament in individual and mutual activity
p 198 N85-19621

Dialog system of preparation and presentation of visual information
p 198 N85-19622

Electrosleep therapy advanced at medical institute
p 188 N85-19623

Restructuring of the process of visual recognition as perception conditions alter
p 199 N85-19624

USSR report: Life sciences. Biomedical and behavioral sciences
[JPRS-UBB-85-009] p 177 N85-19625

Be healthy, pilot
p 188 N85-19626

Methods of monitoring mental work efficiency, emotional activity
p 199 N85-19627

L**Louisville Univ., Ky.**

Contradictory results in interferon research
p 170 A85-24499

M**Massachusetts Inst. of Tech., Cambridge.**

Tyrosine administration enhances dopamine synthesis and release in light-activated rat retina
p 170 A85-24500

Selecting one among the many: A simple network implementing shifts in selective visual attention
[AD-A148989] p 199 N85-19644

Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).

Observations of physiological and psychological effects of terrain following flight based on in-flight test experience
p 209 N85-19657

Impact of future aircombat characteristics on pilot performance and cockpit design
p 209 N85-19661

Metro Air, Ronkonkoma, N.Y.

Use of simplifier scenarios for CRM training
p 197 N85-18016

Miami Univ., Oxford, Ohio.

Tilt from a head-inverted position produces displacement of visual subjective vertical in the opposite direction
p 195 A85-25790

Michigan State Univ., East Lansing.

Scattering of electromagnetic waves by human body and its applications
p 185 N85-18572

Michigan Univ., Ann Arbor.

New estimates of asymmetric decomposition of racemic mixtures by natural beta-radiation sources
p 211 A85-24440

Mount Sinai School of Medicine, N. Y.

Respiratory chain of alkalophilic bacteria
[DE84-012558] p 174 N85-18556

N**National Aeronautics and Space Administration, Washington, D. C.**

Aerospace medicine and biology: A continuing bibliography with indexes
[NASA-SP-7011(269)] p 188 N85-19628

Aircraft noise effects: An interdisciplinary study of the effects of aircraft noise on man. Part 1: Basic report
[NASA-TM-75819] p 188 N85-19629

Aircraft noise effects: An interdisciplinary study of the effect of aircraft noise on man. Part 2: Appendix
[NASA-TM-75818] p 188 N85-19630

Aircraft noise effects: An interdisciplinary study of the effect of aircraft noise on man. Part 3: Supplemental analyses of the social-scientific portion of the study on aircraft noise conducted by the DFG
[NASA-TM-75802] p 188 N85-19631

National Aeronautics and Space Administration, Ames Research Center, Moffett Field, Calif.

Reduction of display artifacts by random sampling
p 204 A85-24291

Model of human visual-motion sensing
p 194 A85-24393

The effects of time delay in man-machine control systems: Implications for design of flight simulator Visual-Display-Delay compensation
[AD-P004329] p 205 N85-17983

Low-cost training technology
p 196 N85-18011

Influence of a perspective cockpit traffic display format on pilot avoidance maneuvers
p 210 N85-19668

Pilot workload, performance and aircraft control automation
p 210 N85-19670

Aircar-aircraft integration issues in future US Army helicopters
p 210 N85-19672

National Aeronautics and Space Administration.**Goddard Space Flight Center, Greenbelt, Md.**

An overview of medical-biological radiation hazards in earth orbits
[IAF PAPER 83-256] p 203 A85-23811

National Aeronautics and Space Administration.**Langley Research Center, Hampton, Va.**

A system-level approach to automation research
p 202 A85-23197

Naval Air Development Center, Warminster, Pa.

Analysis of the transient response of temporal artery blood flow data relative to various anti-G suit pressure schedules
p 190 N85-19660

The F-18: A new era for human factors
p 210 N85-19671

Naval Health Research Center, San Diego, Calif.

Morbidity and mortality associated with exposure to Otto Fuel II in the U.S. Navy 1966-1979
[AD-A148726] p 185 N85-18574

Naval Postgraduate School, Monterey, Calif.

Man-machine interaction: Operator
[AD-A149075] p 207 N85-19648

Naval Submarine Medical Research Lab., Groton, Conn.

Effect of extreme peripheral light on dark adaptation
[AD-A148923] p 189 N85-19636

Individual differences in chromatic brightness matching
[AD-A148882] p 199 N85-19641

The relative effectiveness of red and white light for subsequent dark-adaptation
[AD-A148883] p 199 N85-19642

Naval Training Equipment Center, Orlando, Fla.

Simulator sickness: Sensorimotor disturbances induced in flight simulators
[AD-P004334] p 184 N85-17988

New Jersey Medical School, Newark.

The physiology of ultradian rhythms and their role in affecting disease resistance
[AD-A148842] p 185 N85-18575

New Mexico Univ., Albuquerque.

The effect of inert gases on ion transport across the erythrocyte membrane
[AD-A148889] p 189 N85-19635

O**Oak Ridge National Lab., Tenn.**

Approaches to radiation guidelines for space travel
[DE85-001248] p 186 N85-18576

CORPORATE SOURCE

Artificial photosynthesis with algal and reconstituted systems
[DE85-002557] p 176 N85-19604

Osaka Univ. (Japan).
Abiotic synthesis of purines and other heterocyclic compounds by the action of electrical discharges
p 211 A85-23868

P**Pennsylvania Airlines, Middletown.**

Video concepts in CRM training
p 197 N85-18015

Piedmont Aviation, Inc., Winston-Salem, N. C.
Management training for cockpit crews at Piedmont flight
p 197 N85-18013

R**Ransome Airlines, Philadelphia, Pa.**

Simulation
p 197 N85-18024

Research Inst. of National Defence, Stockholm (Sweden).
Hydrogen-oxygen (hydrox) breathing at 1.3MPa
[FOA-C-58015-H] p 186 N85-18577

Royal Air Force Inst. of Aviation Medicine, Farnborough (England).
Some effects of display format variables on the perception of aircraft spatial orientation
p 210 N85-19666

Royal Aircraft Establishment, Farnborough (England).
Changing system and display concepts and their impact on aircrew performance
p 209 N85-19665

S**Scenic Air Lines, Inc., Las Vegas, Nev.**

Dynamic training devices in CRM training
p 197 N85-18018

Low cost training aids and devices
p 197 N85-18025

Seville Training Systems Corp., Pensacola, Fla.

Flight crew training technology: A review
p 196 N85-18010

Smiths Industries Ltd., Bishops Cleeve (England).
Aircrew and avionics: Friends or Foes?
p 208 N85-19654

SRI International Corp., Menlo Park, Calif.
Generation-V dual-Purkinje-image eyetracker
p 204 A85-25089

Stanford Univ., Calif.
Beta-decay, Bremsstrahlen, and the origin of molecular chirality
p 211 A85-23869

Color measurement and discrimination
[NASA-CR-3824] p 206 N85-18579

T**Texas Univ. Health Science Center, San Antonio.**

Genetic effects of microwave exposure on mammalian cells in vitro. Volume 2, Appendix A: Cytogenetics and growth kinetics data, 850 MHz
[AD-A148866] p 175 N85-19599

Genetic effects of microwave exposure on mammalian cells in vitro. Volume 2, Appendix B: Cytogenetics and growth kinetics data, 1.2 GHz
[AD-A148867] p 176 N85-19600

Genetic effects of microwave exposure on mammalian cells in vitro, volume 2
[AD-A149347] p 176 N85-19603

Tulane Univ., Covington, La.
Biomechanical studies of impact acceleration research
[AD-A149077] p 176 N85-19601

U**Uniformed Services Univ. of the Health Sciences, Bethesda, Md.**

Blood viscosity responses to acute exercise and aerobic conditioning in women
p 185 N85-18573

United Air Lines, Inc., Chicago, Ill.
Integrated approach to flight crew training
p 197 N85-18014

University of Western Ontario, London.
Tyrosine administration enhances dopamine synthesis and release in light-activated rat retina
p 170 A85-24500

USAir, Pittsburgh, Pa.
Captain development training at US Air
p 196 N85-18012

V

Virginia Polytechnic Inst. and State Univ., Blacksburg.
Improvement of workload estimation techniques in
piloting tasks
[NASA-CR-174374]

p 207 N85-19646

W

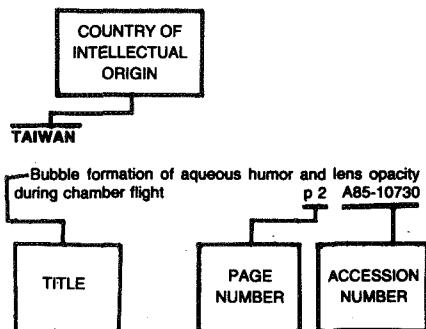
Wake Forest Univ., Winston-Salem, N.C.
New estimates of asymmetric decomposition of racemic
mixtures by natural beta-radiation sources
p 211 A85-24440

FOREIGN TECHNOLOGY INDEX

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Supplement 272)

JUNE 1985

Typical Foreign Technology Index Listing



Listings in this index are arranged alphabetically by country of intellectual origin. The title of the document is used to provide a brief description of the subject matter. The page number and the accession number are included in each entry to assist the user in locating the citation in the abstract section.

A

ARGENTINA
Suprathreshold contrast perception at different
luminance levels p 195 A85-25774

B

BULGARIA
Efficiency of the Eleutherococcus treatment of
enuresis p 181 A85-23261

C

CANADA
Visual responses to vorticity and the neural analysis of
optic flow p 194 A85-24390

Tyrosine administration enhances dopamine synthesis
and release in light-activated rat retina
p 170 A85-24500

Chronic exercise and left ventricular structure and
function in healthy human subjects p 184 A85-25703

Ventilation and acid-base balance in awake dogs
exposed to heat and CO₂ p 172 A85-25709

D

DENMARK
Conceptual model of critical requirements for effective
pilot performance in high performance aircraft
p 209 N85-19663

E

ESTONIA

Carbohydrate metabolism and acid-base equilibrium in
relation to nutrition in persons performing physical and
mental work in the Estonian SSR p 181 A85-23274
Protein metabolism in the muscles following muscular
work p 171 A85-25647

A mathematical model of visual perception regarding
peripheral vision and its application to the Hermann's
illusion p 195 A85-25199

Ammonium contents of biotites from Precambrian rocks
in Finland - The significance of NH₄(+) as a possible
chemical fossil p 212 A85-25839

L

LATVIA

Certain problems in the automated assessment of the
operating efficiency of man-machine systems
p 203 A85-24035

LITHUANIA

The effect of isatin and its derivatives on certain indices
of carbohydrate metabolism p 168 A85-23295

N

NETHERLANDS

Spatial and temporal parameters of motion detection
in the peripheral visual field p 193 A85-24387
The colours are not on the display - A survey of
non-veridical perceptions that may turn up on a colour
display p 195 A85-25814

NEW ZEALAND

Visual flow and direction of locomotion
p 196 A85-25825

S

SWEDEN

Hydrogen-oxygen (hydrox) breathing at 1.3MPa
|FOA-C-58015-H1| p 186 N85-18577

U

U.S.S.R.

Methodology and techniques of psychophysiological
studies of operator activity p 177 A85-23151

Psychophysiological study of visual fatigue and recovery
of the initial level of work capacity p 177 A85-23152

Effect of daily routine on the functional state of operators
according to heart-rhythm parameters p 177 A85-23153

Adaptivity of the eye-hand system of a human
operator p 190 A85-23154

The use of acupuncture to correct psychophysiological
states in humans p 177 A85-23155

A method for controlling the state of an operator in
conditions of complex activity p 190 A85-23156

Psychophysiological methods for the assessment of the
state of a human operator during the controlled effect of
ethanol p 178 A85-23157

Assessment of functional reserves of an operator in a
state of fatigue p 178 A85-23158

Rapid monitoring and prediction of the
psychophysiological state of an operator during the
simulation of emergency situations p 190 A85-23159

Slow negative potentials and probabilistic prediction
p 178 A85-23160

Investigation of the functional state of a human operator
during the formation of a mental habit p 191 A85-23161

Algorithm for the computer identification and processing
of the psychophysiological parameters of human operators
in a tracking process p 202 A85-23162

Development of a complex of programs of spectral EEG
analysis for the operational diagnostics of the functional
state of human operators p 178 A85-23163

The stress index as an index of the work state of an
operator p 178 A85-23164

Application of active oculography and
electroneuromyography to analyze the effect of drugs
p 178 A85-23165

A method for comparing the simple sensorimotor
responses of interacting operators p 202 A85-23166

Experimental atherosclerosis in middle-altitude
conditions p 165 A85-23201

INTERNATIONAL ORGANIZATION

Oversight in Eurocontrol-Central, Maastricht UAC
p 205 A85-25515

J

JAPAN

Abiotic synthesis of purines and other heterocyclic
compounds by the action of electrical discharges
p 211 A85-23868

Interaction between saccade and tracking vergence
p 194 A85-24501

FO
RE
I
G
N

- Effect of a low-frequency alternating magnetic field on the course of pyrogenic fever p 165 A85-23202
- Responses of people to heat load in saunas p 178 A85-23203
- Effect of decimeter-range waves on the aggregation activity of thrombocytes, given different localizations of effects in victims of cerebral insult p 178 A85-23204
- Hygienic standardization of whole-body vibration p 178 A85-23205
- The evaluation of summary vibration load and some biomedical factors in determining the risk of vibration-induced illness in miners p 179 A85-23206
- A comparative evaluation of various methods for the treatment of miners with vibration-induced and noise-induced pathologies p 179 A85-23207
- The correction of microcirculatory disorders from vibrational illness p 179 A85-23208
- A mechanism for the effect of noise on the labyrinth p 165 A85-23209
- Dose assessment of noise load on tractor operators in agriculture p 179 A85-23210
- Effect of total-body vibration and noise on the functional state of human operators p 179 A85-23211
- Efficiency of the treatment of patients with vibration sickness by means of sinusoidal modulated currents p 179 A85-23212
- Treatment of vibration sickness in coal miners by means of hyperbaric oxygenation p 179 A85-23213
- Objective evaluation of vegetovascular dystonia and psychoemotional disturbances in patients with vibration sickness p 179 A85-23214
- The use of enzymes to correct the immune response under vibration loading p 165 A85-23215
- Noise protection of workers in the sawmill and wood-processing industry p 179 A85-23216
- Effect of low-frequency acoustic oscillations and certain erythrocyte membrane components in vitro p 165 A85-23218
- Physiological characterization of the work of the operating personnel of a power system in an arid zone p 179 A85-23219
- The syncopal state associated with moderate craniocerebral trauma p 179 A85-23220
- Severe renal insufficiency due to hyperuricemia and urate nephrolithiasis p 180 A85-23221
- Computer tomography of alveococcosis in the liver p 180 A85-23222
- Hematological complications of drug therapy p 180 A85-23223
- Gravitational adaptation in forest trees p 166 A85-23224
- The genetic similarity of man and the anthropoid apes p 166 A85-23225
- Activity, act, and the psychic as a process p 191 A85-23226
- The dynamics of reflexive operations in productive thinking activity p 191 A85-23227
- Levels of development of the need for cognition p 191 A85-23228
- The effect of success and failure on the human functional state p 191 A85-23229
- A complex method for evaluating the color vision of patients with localized cerebral lesions p 180 A85-23230
- A method for studying work activities p 191 A85-23231
- Certain conclusions and prospects of study pertaining to the vascular system in the case of limitations on motor activity p 166 A85-23232
- The effect of hypodynamia on the hemomicrocirculatory bed in rat triceps brachii muscle and its fascia p 166 A85-23233
- The structure of the renal artery wall during restricted motor activity p 166 A85-23234
- Changes in the size of the long tubular bones and body mass of rats under physical loads graded according to the time of day p 166 A85-23235
- The structural characteristics of the metacarpal bones of athletes practising a variety of sports p 180 A85-23236
- The state of the sanguiferous bed of the vascular tunic of the eyeball and retrobulbar formations in association with experimental vascular congestion p 166 A85-23237
- The relief characteristics of the internal surface of the cardiac ventricles and Viessen-Thebesian vessels p 180 A85-23238
- The morphofunctional characteristics of intraorgan arterial vessels in the kidney in the normal state and in certain cardiovascular diseases p 180 A85-23239
- Significance of ultrasonic echo studies for human anatomy p 180 A85-23240
- Anatomical aspects of the use of computer tomography (Review of the non-Soviet literature) p 166 A85-23241
- Image of the world and psychological investigation of thinking p 191 A85-23242
- Effect of intragroup favoritism in laboratory and natural conditions p 191 A85-23243
- Functional work load on an operator for various regimes of the movement of closed eyes p 191 A85-23244
- Effect of visual features of the stimulus material on the formation of functional units of memory p 191 A85-23245
- Scintigraphy and emission computer tomography of the head in the diagnosis of intracranial vascular congestion p 180 A85-23246
- The state of the central and cerebral hemodynamics in normal subjects and in patients with incipient cerebral circulation insufficiency p 180 A85-23247
- The hemodynamics of various stages of nighttime sleep in patients with preliminary symptoms of cerebral hemodynamic deficiency p 180 A85-23248
- Climatological aspect of the epidemiology of acute disturbances of brain circulation (Review) p 180 A85-23249
- The complex study of man - The place of psychology p 191 A85-23250
- Structural studies of human IgA1 and IgA2 immunoglobulins tagged with two different spin-labels p 181 A85-23251
- Cell surface RNA - A possible molecular receptor for adaptogens p 166 A85-23252
- Magnetic susceptibility and the magnetic capture of cells p 167 A85-23253
- The mechanism of variations in erythrocyte electrophoretic mobility in response the UHF irradiation p 167 A85-23254
- A simulation of the regional deposition of air ions in human lungs p 181 A85-23255
- An optical study of electromechanical coupling in heart fibers p 167 A85-23256
- An analysis of the regulation of noradrenaline secretion by autoadreno-receptors and frequency stimulation p 167 A85-23258
- Configurational generators of neural rhythm p 167 A85-23259
- Temporary endocardial electrocardiostimulation during disturbances of heart rhythm and conduction p 181 A85-23260
- Amplitude characteristics of the electric field of the heart p 181 A85-23262
- Endocrine structure of the kidneys in hypertensive disease p 181 A85-23263
- The age-related aspects of vestibular function in patients with chronic purulent otitis media according to cupulometry data p 181 A85-23264
- An investigation of the cerebral hemodynamics of workers exposed to industrial noise p 181 A85-23265
- Protein synthesis and DNA replication in lymphocytes in an immune response p 167 A85-23266
- Phagocytosis - Physiological and molecular aspects p 167 A85-23267
- Some methodological approaches to predicting the functional state of the body associated with hazardous environmental factors p 167 A85-23268
- Hygienic standards for electromagnetic radiation in the home p 168 A85-23269
- Experience with a centralized provision for individual radiation-dose monitoring p 202 A85-23270
- Experience with the early diagnosis and prevention of the vibration sickness of construction workers p 181 A85-23271
- Investigation of the dynamics of the automicoflora of the skin and fauces, and the bacterial contamination of the underclothes of mine workers p 202 A85-23273
- The effect of an iron deficient diet on the formation of bone tissue p 168 A85-23275
- Some perspectives on the study and improvement of the cognitive-creative activity of an individual and a group p 191 A85-23276
- Panoramic vision and its applications p 192 A85-23277
- Interpersonal activity in conditions of group learning p 192 A85-23278
- Some principles for the construction of an adaptive training system p 192 A85-23279
- Psychological aspects of the phenomenon of spatial synchronization of potentials p 192 A85-23280
- An investigation of the psychological aspects of individual manifestations of sociability in humans p 192 A85-23281
- Method for the experimental study of visual-motor coordination p 192 A85-23282
- The principles of experimental setup in models of complex human operator activities p 192 A85-23283
- Interrelationship between learning and development in the process of mastering an occupational activity p 192 A85-23285
- Automation of an investigation procedure using a 16-factor personality questionnaire p 192 A85-23286
- Probabilistic model of the unconscious - The unconscious as manifestation of a semantic universe p 193 A85-23287
- Extraction of a complex signal from memory p 193 A85-23288
- Style of personal contact as a factor in the efficiency of communal activity p 193 A85-23289
- Fatty acid metabolism in the myocardium under normal conditions and in cardiac disease (Survey) p 168 A85-23290
- Changes in the composition of mitochondrial lipids in the presence of dinitrophenol under hypoxic conditions p 168 A85-23291
- Alcohol dehydrogenase in the blood serum of healthy persons and of patients with chronic alcoholism p 182 A85-23292
- The effect of deficient blood supply in the heart on ATPase systems p 168 A85-23293
- Effect of methylmethacrylate and acrylamide on the microsomal oxidation system in the rat liver p 168 A85-23294
- Investigation of the total activity and distribution of multiple forms of a number of lysosomal glycosidases in subfractions of human leukocytes p 182 A85-23296
- Effect of lethal and superlethal doses of gamma radiation on the activity of lysosomal enzymes in radio-sensitive and radio-resistant rat tissues p 168 A85-23297
- Status of the kallikrein-kinin system in blood from the cardiac ventricles in the development dynamics of spontaneous hypertension in rats p 169 A85-23298
- An evaluation of the effectiveness of treatment based on survival rate tables p 182 A85-23299
- Organization and efficiency of a team-basis method for the prophylactic ultraviolet irradiation of coal miners p 182 A85-23300
- The morphological basis of a 'minimization function' for the nephron epithelium during uniform hyperthermia p 169 A85-23301
- The effect of magnetic fields on somatic cell division in plants p 169 A85-23302
- Redundancy as a principle of the programming activity of the brain p 169 A85-23303
- An analysis of light and technical parameters for visual acuity measurement devices and some methods for their standardization p 202 A85-23304
- Activation and localization of transport ATPase in cells of pea-seedling roots in hypogravity conditions p 169 A85-23305
- Prospects for the use of models of autoregression-sliding mean type for EEG analysis p 182 A85-23306
- The connection between the parameters of sodium and potassium distribution and the contractile properties of muscles p 169 A85-23307
- Free amino acids in the brains of some vertebrates p 169 A85-23308
- Specific glucocorticoid receptors of human muscle cytosol p 182 A85-23309
- An electron microscopic and cytochemical investigation of blood lymphocyte subpopulations in association with corticosteroid deficiency p 169 A85-23310
- Ways to enhance the efficiency of the correction of hypoxic states p 182 A85-23311
- Mechanism for the increase of arterial pressure in a state of rest and during physical exercise in patients with hypertension p 182 A85-23312
- Effect of decimeter waves on the relative content of T-lymphocytes in the lymphoid organs p 169 A85-23313
- Spatial localization and projection of sensory images p 193 A85-23314
- Methodological problems of man-machine interaction in the solution of mathematical problems p 202 A85-23315
- The pharmacological correction of fatigue p 169 A85-23725
- Change in ornithine carbamoyltransferase activity in rats after X-ray irradiation and the administration of a vitamin-coenzyme complex p 170 A85-24026
- Effect of an elevated level of natural radioactivity on glycogen content in peripheral-blood leukocytes of *Microtus oeconomus Pall* p 170 A85-24027
- Effect of random perturbations on the controllability domain in ergatic dynamic systems p 203 A85-24030
- Estimation of the efficiency of two-goal differential-game ergatic control systems p 203 A85-24031
- Assessment of the work capacity of ergatic systems p 203 A85-24032
- A methodology for determining the parameters of a pilot as an information-processing control system p 203 A85-24033
- Simulation of pilot activity on the basis of onboard-recorder data p 203 A85-24034
- Simulation model for assessing the combined effect of engineering and psychological factors on the efficiency of a man-machine system p 203 A85-24036

FOREIGN TECHNOLOGY INDEX

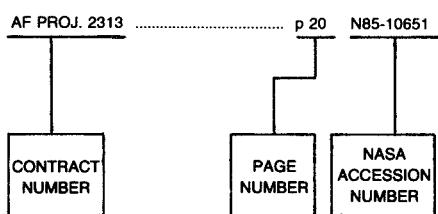
- Investigation of the goal-directed motions of a human in an unsupported state p 204 A85-24037
- Optimization of pilot-retraining programs with allowance for the individual qualities of the pilots p 204 A85-24038
- Energy transfer in plants in weightlessness p 170 A85-24193
- The photosynthetic apparatus of bacteria as a converter of the energy of light into electrical energy p 170 A85-24650
- The effect of silicates on the thermal stability of amino acids p 211 A85-25568
- Force feedback in a manipulator control system p 205 A85-25584
- Change in the response of the heart to posthypoxic reoxygenation after injection of superoxide dismutase and its inhibitor p 171 A85-25617
- Drop in nervous-system load as a risk factor in the development of myocardial infarction p 182 A85-25618
- Promising methods for early laboratory diagnosis of infectious diseases p 183 A85-25619
- Prevention measures for the adverse effects of vibration p 183 A85-25620
- The variability of functional system structure during physical activity and in the presence of fatigue p 183 A85-25643
- General features of sensory processes under the effects of extreme stimuli p 171 A85-25644
- The integration of motor and vegetative functions during muscular work p 183 A85-25645
- The dynamics of an extremely slow omega-potential and EEG spatial synchronization in the presence of muscle fatigue p 183 A85-25646
- Maximal blood-circulation modes p 183 A85-25648
- Redox processes in the rat myocardium under acute hypoxia p 172 A85-26251
- Specific differences and seasonal fluctuations in blood serum enzyme activity in experimental animals p 172 A85-26252
- Changes in redox processes in rats with anemia due to alkylating preparations in alpine climatic conditions p 172 A85-26253
- The effect of long-term stress on the hypophyseal-adrenal-gonad systems in rabbits of various ages p 172 A85-26254
- Methodological aspects of the problem of neurohumoral regulation and their implications for the cognition of pain mechanisms p 173 A85-26255
- The basic properties of the nervous system and their role in occupational activity p 196 A85-26256
- An investigation of the isovolumic indices of myocardial contractility in response to directed changes in heart function p 173 A85-26257
- Changes in central hemodynamic parameters under the influence of volume loading in a healthy state, and during experimental myocardial infarction p 173 A85-26258
- An estimate of the efficiency of intrapulmonary gas exchange during muscular work in hypoxic conditions p 184 A85-26259
- The function of the adrenal cortex and the ovaries in normal subjects and in patients with iron deficiency anemia from an arid region during adaptation to mountain conditions p 184 A85-26260
- The effect of paradoxical sleep deprivation on the learning of the active avoidance reaction p 173 A85-26261
- The role of mitochondria in the regulation of Ca(2+) transmembrane current in myocardial cells p 173 A85-26285
- Neurochemical mechanisms for the regulation of pain sensitivity p 173 A85-26286
- The locomotor region of the truncus cerebri and the hypothesis of a locomotor column p 174 A85-26287
- The physiological role of adrenergic elements of the hypothalamus in the regulation of hypothalamo-adenohypophyseal systems of adaptation p 174 A85-26288
- A model of a constant color perception pattern for the case of continuous spectral functions p 184 A85-26296
- Nonlinear and parametric resonance in human hearing and sight organs p 174 A85-26297
- The physical basis for the generation of neuromagnetic fields p 174 A85-26298
- USSR report: Life sciences. Biomedical and behavioral sciences
- |JPRS-UBB-85-002| p 174 N85-18559
- Growth of soil bacteria in presence of Martian soil analog, carbon dioxide and hydrogen peroxide p 175 N85-18560
- Role of engineering psychology p 197 N85-18561
- Effect of modulated ultrahigh frequency field on behavior and hormone level in female rats under emotional stress p 175 N85-18562
- Methodical approaches to determination of sanitation protective zone dimensions around TV centers and TV retransmitters p 185 N85-18563
- Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 1: Expression of ABO and Rhesus system antigen p 175 N85-18564
- Functional and structural changes in human erythrocyte surface after irradiation by UV waves of various wavelengths. Report 2: Adsorption of alcyan blue by external premembranous components p 175 N85-18565
- USSR report: Life sciences. Biomedical and behavioral sciences
- |JPRS-UBB-85-007| p 175 N85-18566
- Work capacity of heat and electric power plant operations working 12 hour day and night shifts p 206 N85-18567
- Success in learning occupation of chemical production technician as function of certain personality traits and development of psychophysiological functions p 206 N85-18568
- Study of bodily functional status and quality of controlling action of power unit operators with various intensities of labor p 206 N85-18569
- Problems of psychological support of automated organization control systems p 197 N85-18570
- Problems of psychological support of automated organization control systems p 198 N85-18571
- USSR report: Life sciences. Biomedical and behavioral sciences
- |JPRS-UBB-85-008| p 176 N85-19605
- Work physiology of operating personnel at power plants in arid regions p 207 N85-19606
- Health standards for general vibration p 186 N85-19607
- Effects of overall vibration and noise on operational personnel p 207 N85-19608
- Management of vibration sickness in coal mines by hyperbaric oxygenation p 186 N85-19609
- Comparative assessment of different treatment modalities in miners with vibration- and noise-induced disease p 186 N85-19610
- Management of microcirculatory disorders in vibration sickness p 186 N85-19611
- Modulated sinusoidal currents in management of vibration sickness p 187 N85-19612
- Effects of partial deprivation of slow-wave sleep on sleep-wakefulness cycles p 187 N85-19613
- Quantitative measurement of human auditory acuity p 187 N85-19614
- Influence of hyperthermia on body temperature and content of catecholamines in white rat hypothalamus p 176 N85-19615
- USSR report: Life sciences. Biomedical and behavioral sciences
- |JPRS-UBB-85-011| p 177 N85-19616
- Specifics of human thermal regulatory reactions upon exposure to coriolis acceleration p 187 N85-19617
- Determination of functional mobility of human nervous system with the PNN-3 instrument p 187 N85-19618
- Variability of cardiac rhythm during information loading p 187 N85-19619
- Study of cognitive styles of students in automated teaching system p 198 N85-19620
- Functional role of type of person's temperament in individual and mutual activity p 198 N85-19621
- Dialog system of preparation and presentation of visual information p 198 N85-19622
- Electrosleep therapy advanced at medical institute p 188 N85-19623
- Restructuring of the process of visual recognition as perception conditions alter p 199 N85-19624
- USSR report: Life sciences. Biomedical and behavioral sciences
- |JPRS-UBB-85-009| p 177 N85-19625
- Be healthy, pilot p 188 N85-19626
- Methods of monitoring mental work efficiency, emotional activity p 199 N85-19627
- UNITED KINGDOM**
- Immersion suits, past and present p 201 A85-22771
- Spacesuit development - The American experience p 202 A85-23123
- Suspended animation for space flight p 172 A85-25832
- Aircrew and avionics: Friends or Foes? p 208 N85-19654
- Changing system and display concepts and their impact on aircrew performance p 209 N85-19665
- Some effects of display format variables on the perception of aircraft spatial orientation p 210 N85-19666

CONTRACT NUMBER INDEX

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Supplement 272)

JUNE 1985

Typical Contract Number Index Listing



NIH-F32-NS-06516	.....	p 193	A85-24385
NIH-HL-0738-05	.....	p 171	A85-25701
NIH-HL-26963	.....	p 183	A85-25702
NIH-HS-11804	.....	p 171	A85-25705
NIH-R01-HL-29006	.....	p 170	A85-25043
NIH-S-P30-EY-01186	.....	p 171	A85-25701
NR PROJ. 207-086	.....	p 193	A85-24386
NRC A-0296	.....	p 176	N85-19601
NSF PCM-78-22245	.....	p 194	A85-24501
NSF PCM-81-19973	.....	p 170	A85-25043
NSF PHY-77-27084	.....	p 184	A85-25824
NSF-IST-80-00257	.....	p 170	A85-25043
N00014-76-C-0815	.....	p 195	A85-25789
N00014-77-C-0305	.....	p 189	N85-19635
N00014-80-C-0505	.....	p 176	N85-19601
N00014-83-K-0337	.....	p 199	N85-19644
N00014-84-G-0183	.....	p 195	A85-25789
PHS-MH-05286	.....	p 176	N85-19602
PHS-NS-19558	.....	p 184	A85-25824
		p 184	A85-25824

Listings in this index are arranged alphanumerically by contract number. Under each contract number, the accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order with the AIAA accession numbers appearing first. The accession number denotes the number by which the citation is identified in the abstract section. Preceding the accession number is the page number on which the citation may be found.

AF-AFOSR-00085	.....	p 193	A85-24385
AF-AFOSR-0155-83	.....	p 193	N85-19643
AF-AFOSR-78-3711	.....	p 194	A85-24390
AF-AFOSR-80-0279	.....	p 204	A85-24392
AF-AFOSR-82-0148	.....	p 195	A85-25789
AF-AFOSR-82-0345	.....	p 193	A85-24386
DA PROJ. 1L6-63747-D-669	.....	p 206	N85-18580
DA PROJ. 3E1-62777-A-879	.....	p 185	N85-18575
		p 188	N85-19632
		p 189	N85-19634
DA PROJ. 4A7-62720-A-896	.....	p 207	N85-18581
DAMD17-80-C-0166	.....	p 185	N85-18575
DE-AC02-81ER-10871	.....	p 174	N85-18556
DE-AC02-83ER-60142	.....	p 174	N85-18557
DE-AC03-76SF-00098	.....	p 170	A85-25043
		p 200	N85-19645
DE-AC05-84OR-21400	.....	p 186	N85-18576
		p 176	N85-19604
DE-AC07-76ID-01570	.....	p 208	N85-19652
DT-FA01-83-Y-10554	.....	p 207	N85-19647
ESA-83/66	.....	p 174	N85-18558
F33615-80-C-0607	.....	p 175	N85-19599
		p 176	N85-19600
		p 176	N85-19603
F33615-83-C-0507	.....	p 194	A85-24388
F49620-78-C-0058	.....	p 171	A85-25706
F49620-80-C-0057	.....	p 200	A85-22592
F49620-81-C-0055	.....	p 171	A85-25706
F49620-82-K-0006	.....	p 198	N85-18578
NAG2-17	.....	p 207	N85-19646
NASW-3199	.....	p 188	N85-19629
		p 188	N85-19630
		p 188	N85-19631
NASW-3924	.....	p 199	N85-19640
NAS2-9934	.....	p 204	A85-25089
NAS9-14538	.....	p 195	A85-25790
NCC2-213	.....	p 170	A85-24499
NCC2-44	.....	p 206	N85-18579
NGL-05-020-582	.....	p 211	A85-23869
NGR-05-003-460	.....	p 170	A85-23870
NGR-22-009-627	.....	p 170	A85-24500
NGR-44-005-002	.....	p 211	A85-23868
NIH-AM-14228	.....	p 170	A85-24500
NIH-AM-25472	.....	p 171	A85-25705
NIH-AM-31837-02	.....	p 171	A85-25707
NIH-AM-32261	.....	p 172	A85-25708
NIH-EY-010301	.....	p 204	A85-25089
NIH-EY-01128	.....	p 193	A85-24383
NIH-EY-01640	.....	p 194	A85-24389
NIH-EY-03524	.....	p 195	A85-25791
NIH-EY-04647	.....	p 193	A85-24384

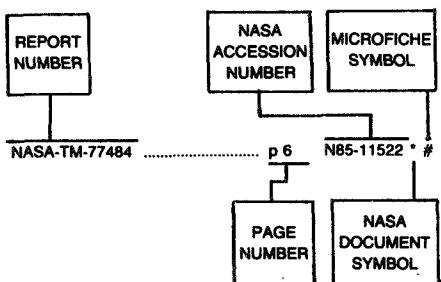
C
O
N
T
R
A
C
T

REPORT NUMBER INDEX

AEROSPACE MEDICINE AND BIOLOGY / A Continuing Bibliography (Supplement 272)

JUNE 1985

Typical Report Number Index Listing



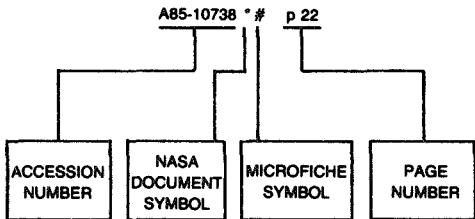
Listings in this index are arranged alphanumerically by report number. The page number indicates the page on which the citation is located. The accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

AD-A148726	p 185	N85-18574	#
AD-A148805	p 206	N85-18580	#
AD-A148809	p 198	N85-18578	#
AD-A148839	p 207	N85-18581	#
AD-A148842	p 185	N85-18575	#
AD-A148845	p 188	N85-19632	#
AD-A148846	p 189	N85-19633	#
AD-A148848	p 189	N85-19634	#
AD-A148866	p 175	N85-19599	#
AD-A148867	p 176	N85-19600	#
AD-A148881	p 207	N85-19647	#
AD-A148882	p 199	N85-19641	#
AD-A148883	p 199	N85-19642	#
AD-A148889	p 189	N85-19635	#
AD-A148912	p 199	N85-19643	#
AD-A148923	p 189	N85-19636	#
AD-A148989	p 199	N85-19644	#
AD-A149075	p 207	N85-19648	#
AD-A149077	p 176	N85-19601	#
AD-A149102	p 208	N85-19649	#
AD-A149132	p 176	N85-19602	#
AD-A149347	p 176	N85-19603	#
AD-A149413	p 208	N85-19650	#
AD-A149454	p 189	N85-19637	#
AD-D011468	p 208	N85-19651	#
AD-E301513	p 199	N85-19644	#
AD-E850737	p 189	N85-19635	#
AD-E850737	p 199	N85-19641	#
AD-E850737	p 199	N85-19642	#
AD-F300518	p 188	N85-19632	#
AD-F300518	p 189	N85-19633	#
AD-F300518	p 189	N85-19634	#
AD-P004329	p 205	N85-17983	*
AD-P004334	p 184	N85-17988	#
AFOSR-84-1107TR	p 198	N85-18578	#
AFOSR-84-1125TR	p 199	N85-19643	#
AGARD-CP-371	p 208	N85-19653	#
AI-M-770	p 199	N85-19644	#
CERL-TR-N-85/01	p 207	N85-18581	#
CONF-840389-7	p 176	N85-19604	#
CONF-8406167-5	p 186	N85-18576	#
CONF-840817-2	p 200	N85-19645	#
CONF-840963-5	p 208	N85-19652	#
DE84-012558	p 174	N85-18556	#
DE84-014885	p 174	N85-18557	#
DE85-000710	p 200	N85-19645	#
DE85-001248	p 186	N85-18576	#
DE85-002557	p 176	N85-19604	#
DE85-003552	p 208	N85-19652	#
DOE/ER-10871/T1	p 174	N85-18556	#
DOE/ER-60142/2	p 174	N85-18557	#
EGG-M-16684	p 208	N85-19652	#
EPA/600-8-84-019F	p 190	N85-19639	#
ESA-BR-21	p 174	N85-18558	#
FAA-AM-84-9	p 189	N85-19637	#
FAA-AP-84-18	p 207	N85-19647	#
FOA-C-58015-H1	p 186	N85-18577	#
FR-4	p 207	N85-19647	#
IAF PAPER 83-256	p 203	A85-23811	*
ISBN-92-835-0368-6	p 208	N85-19653	#
ISSN-0250-1589	p 174	N85-18558	#
ISSN-0347-7665	p 186	N85-18577	#
JPRS-UBB-85-002	p 174	N85-18559	#
JPRS-UBB-85-007	p 175	N85-18566	#
JPRS-UBB-85-008	p 176	N85-19605	#
JPRS-UBB-85-009	p 177	N85-19625	#
JPRS-UBB-85-011	p 177	N85-19616	#
LBL-17763	p 200	N85-19645	#
NAS 1.15:75802	p 188	N85-19631	*
NAS 1.15:75818	p 188	N85-19630	*
NAS 1.15:75819	p 188	N85-19629	*
NAS 1.21:7011(269)	p 188	N85-19628	*
NAS 1.26:174374	p 207	N85-19646	*
NAS 1.26:175473	p 199	N85-19640	*
NAS 1.26:3824	p 206	N85-18579	*
NASA-CR-174374	p 207	N85-19646	*
NASA-CR-175473	p 199	N85-19640	*
NASA-CR-3824	p 206	N85-18579	*
NASA-SP-7011(269)	p 188	N85-19628	*
NASA-TM-75802	p 188	N85-19631	*
NASA-TM-75818	p 188	N85-19630	*
NASA-TM-75819	p 188	N85-19629	*
NATICK/TR-84/045	p 206	N85-18580	#
NAVHLLTHRSHC-84-35	p 185	N85-18574	#
NSMRL-1031	p 199	N85-19641	#
NSMRL-1036	p 199	N85-19642	#
NSMRL-1039	p 189	N85-19636	#
PB85-123925	p 190	N85-19639	#
PB85-124196	p 190	N85-19638	#
SAE PAPER 841587	p 196	A85-25985	#
SAE PAPER 841588	p 205	A85-25986	#
SAE PAPER 841589	p 196	A85-25987	#
US-PATENT-APPL-SN-613497	p 208	N85-19651	#
USAFSAM-TR-84-24-APP-A	p 175	N85-19599	#
USAFSAM-TR-84-24-APP-B	p 176	N85-19600	#
USAFSAM-TR-84-24-VOL-2	p 176	N85-19603	#
USARIEM-M-10/85	p 188	N85-19632	#
USARIEM-M-11/85	p 189	N85-19634	#
USARIEM-M-9/85	p 189	N85-19633	#

R
E
P
O
R
T

ACCESSION NUMBER INDEX

Typical Accession Number Index Listing



Listings in this index are arranged alphanumerically by accession number. The page number listed to the right indicates the page on which the citation is located. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A85-22589 # p 190	A85-23223 # p 180	A85-23279 # p 192	A85-25584 # p 205	N85-18569 # p 206
A85-22590 # p 200	A85-23224 # p 166	A85-23280 # p 192	A85-25617 # p 171	N85-18570 # p 197
A85-22592 # p 200	A85-23225 # p 166	A85-23281 # p 192	A85-25618 # p 182	N85-18571 # p 198
A85-22755 # p 200	A85-23226 # p 191	A85-23282 # p 192	A85-25619 # p 183	N85-18572 # p 185
A85-22756 # p 200	A85-23227 # p 191	A85-23283 # p 192	A85-25620 # p 183	N85-18573 # p 185
A85-22759 # p 200	A85-23228 # p 191	A85-23284 # p 192	A85-25643 # p 183	N85-18574 # p 185
A85-22761 # p 201	A85-23229 # p 180	A85-23285 # p 192	A85-25644 # p 171	N85-18575 # p 185
A85-22763 # p 201	A85-23231 # p 191	A85-23286 # p 192	A85-25645 # p 183	N85-18576 # p 186
A85-22770 # p 201	A85-23232 # p 166	A85-23287 # p 193	A85-25646 # p 183	N85-18577 # p 186
A85-22771 # p 201	A85-23233 # p 166	A85-23288 # p 193	A85-25647 # p 171	N85-18578 # p 198
A85-22772 # p 201	A85-23234 # p 166	A85-23289 # p 193	A85-25648 # p 183	N85-18579 # p 206
A85-22773 # p 201	A85-23235 # p 166	A85-23290 # p 168	A85-25657 # p 211	N85-18580 # p 206
A85-22775 # p 177	A85-23236 # p 180	A85-23291 # p 168	A85-25674 # p 211	N85-18581 # p 207
A85-22853 # p 165	A85-23237 # p 166	A85-23292 # p 182	A85-25701 # p 171	N85-19599 # p 175
A85-23123 # p 202	A85-23238 # p 180	A85-23293 # p 168	A85-25702 # p 183	N85-19600 # p 176
A85-23151 # p 177	A85-23239 # p 180	A85-23294 # p 168	A85-25703 # p 184	N85-19601 # p 176
A85-23152 # p 177	A85-23240 # p 180	A85-23295 # p 168	A85-25704 # p 184	N85-19602 # p 176
A85-23153 # p 177	A85-23241 # p 166	A85-23296 # p 182	A85-25705 # p 171	N85-19603 # p 176
A85-23154 # p 190	A85-23242 # p 191	A85-23297 # p 168	A85-25706 # p 171	N85-19604 # p 176
A85-23155 # p 177	A85-23243 # p 191	A85-23298 # p 169	A85-25707 # p 171	N85-19605 # p 176
A85-23156 # p 190	A85-23244 # p 191	A85-23299 # p 182	A85-25709 # p 172	N85-19606 # p 207
A85-23157 # p 178	A85-23245 # p 191	A85-23300 # p 182	A85-25774 # p 195	N85-19607 # p 186
A85-23158 # p 178	A85-23246 # p 180	A85-23301 # p 169	A85-25789 # p 195	N85-19608 # p 207
A85-23159 # p 190	A85-23248 # p 180	A85-23302 # p 169	A85-25790 * # p 195	N85-19609 # p 186
A85-23160 # p 178	A85-23249 # p 180	A85-23303 # p 169	A85-25791 # p 195	N85-19610 # p 186
A85-23161 # p 191	A85-23250 # p 191	A85-23304 # p 202	A85-25814 # p 195	N85-19611 # p 186
A85-23162 # p 202	A85-23251 # p 181	A85-23305 # p 169	A85-25815 # p 195	N85-19612 # p 187
A85-23163 # p 178	A85-23252 # p 166	A85-23306 # p 182	A85-25822 # p 172	N85-19613 # p 187
A85-23164 # p 178	A85-23253 # p 167	A85-23307 # p 169	A85-25824 # p 184	N85-19614 # p 187
A85-23165 # p 178	A85-23254 # p 167	A85-23308 # p 169	A85-25825 # p 196	N85-19615 # p 176
A85-23166 # p 202	A85-23255 # p 181	A85-23309 # p 182	A85-25832 # p 172	N85-19616 # p 177
A85-23197 # p 202	A85-23256 # p 167	A85-23310 # p 169	A85-25839 # p 212	N85-19617 # p 187
A85-23198 # p 202	A85-23257 # p 167	A85-23311 # p 182	A85-25985 # p 196	N85-19618 # p 187
A85-23201 # p 165	A85-23258 # p 167	A85-23312 # p 182	A85-25986 # p 205	N85-19619 # p 187
A85-23202 # p 165	A85-23259 # p 167	A85-23313 # p 169	A85-25987 # p 196	N85-19620 # p 198
A85-23203 # p 178	A85-23260 # p 181	A85-23314 # p 193	A85-26251 # p 172	N85-19621 # p 198
A85-23204 # p 178	A85-23261 # p 181	A85-23315 # p 202	A85-26252 # p 172	N85-19622 # p 198
A85-23205 # p 178	A85-23262 # p 181	A85-23725 # p 169	A85-26253 # p 172	N85-19623 # p 188
A85-23206 # p 179	A85-23263 # p 181	A85-23811 * # p 203	A85-26254 # p 172	N85-19624 # p 199
A85-23207 # p 179	A85-23264 # p 181	A85-23868 * # p 211	A85-26255 # p 173	N85-19625 # p 177
A85-23208 # p 179	A85-23265 # p 180	A85-23869 * # p 211	A85-26256 # p 196	N85-19626 # p 188
A85-23209 # p 165	A85-23266 # p 167	A85-23870 * # p 170	A85-26257 # p 173	N85-19627 # p 199
A85-23210 # p 179	A85-23267 # p 167	A85-24026 # p 170	A85-26258 # p 173	N85-19628 * # p 188
A85-23211 # p 179	A85-23268 # p 167	A85-24027 # p 170	A85-26259 # p 184	N85-19629 * # p 188
A85-23212 # p 179	A85-23269 # p 168	A85-24030 # p 203	A85-26260 # p 184	N85-19630 * # p 188
A85-23213 # p 179	A85-23270 # p 202	A85-24031 # p 203	A85-26261 # p 173	N85-19631 * # p 188
A85-23214 # p 179	A85-23271 # p 181	A85-24032 # p 203	A85-26265 # p 173	N85-19632 * # p 188
A85-23215 # p 165	A85-23272 # p 202	A85-24033 # p 203	A85-26286 # p 173	N85-19633 * # p 189
A85-23216 # p 179	A85-23273 # p 181	A85-24034 # p 203	A85-26287 # p 174	N85-19634 * # p 189
A85-23217 # p 179	A85-23274 # p 181	A85-24035 # p 203	A85-26288 # p 174	N85-19635 * # p 189
A85-23218 # p 179	A85-23275 # p 181	A85-24036 # p 203	A85-26296 # p 184	N85-19636 * # p 189
A85-23219 # p 179	A85-23276 # p 180	A85-24037 # p 204	A85-26297 # p 174	N85-19637 * # p 189
A85-23220 # p 179	A85-23277 # p 180	A85-24038 # p 204	A85-26298 # p 174	N85-19638 * # p 190
A85-23221 # p 180	A85-23278 # p 180	A85-24193 # p 170		N85-19639 * # p 190
A85-23222 # p 180	A85-23279 # p 180	A85-24291 * # p 204		N85-19640 * # p 199
A85-23223 # p 179	A85-23280 # p 181	A85-24301 # p 204	N85-17983 * # p 205	N85-19641 * # p 199
A85-23224 # p 179	A85-23281 # p 181	A85-24302 # p 204	N85-17988 # p 184	N85-19642 * # p 199
A85-23225 # p 165	A85-23282 # p 166	A85-24383 # p 193	N85-18011 * # p 196	N85-19643 * # p 199
A85-23226 # p 178	A85-23283 # p 167	A85-24384 # p 193	N85-18012 * # p 196	N85-19644 * # p 199
A85-23227 # p 202	A85-23284 # p 181	A85-24385 # p 193	N85-18013 * # p 197	N85-19645 * # p 200
A85-23228 # p 179	A85-23285 # p 167	A85-24386 # p 193	N85-18014 * # p 197	N85-19646 * # p 207
A85-23229 # p 179	A85-23286 # p 167	A85-24387 # p 193	N85-18015 * # p 197	N85-19647 * # p 207
A85-23230 # p 165	A85-23287 # p 167	A85-24388 # p 194	N85-18016 * # p 197	N85-19648 * # p 207
A85-23231 # p 178	A85-23288 # p 167	A85-24389 # p 194	N85-18017 * # p 197	N85-19649 * # p 208
A85-23232 # p 178	A85-23289 # p 181	A85-24390 # p 194	N85-18018 * # p 197	N85-19650 * # p 208
A85-23233 # p 178	A85-23290 # p 181	A85-24391 # p 194	N85-18019 * # p 197	N85-19651 * # p 208
A85-23234 # p 178	A85-23291 # p 181	A85-24392 # p 204	N85-18024 * # p 197	N85-19652 * # p 208
A85-23235 # p 179	A85-23292 # p 181	A85-24393 * # p 194	N85-18025 * # p 197	N85-19653 * # p 208
A85-23236 # p 179	A85-23293 # p 181	A85-24433 # p 194	N85-18028 * # p 197	N85-19654 * # p 208
A85-23237 # p 179	A85-23294 # p 181	A85-24440 * # p 211	N85-18556 # p 174	N85-19655 * # p 208
A85-23238 # p 165	A85-23295 # p 167	A85-24499 * # p 170	N85-18557 # p 174	N85-19656 * # p 209
A85-23239 # p 179	A85-23296 # p 167	A85-24500 * # p 170	N85-18558 # p 174	N85-19657 * # p 209
A85-23240 # p 179	A85-23297 # p 167	A85-24501 # p 194	N85-18559 # p 174	N85-19659 * # p 190
A85-23241 # p 165	A85-23298 # p 167	A85-24650 # p 170	N85-18560 # p 175	N85-19660 * # p 190
A85-23242 # p 179	A85-23299 # p 168	A85-25043 * # p 170	N85-18561 # p 197	N85-19661 * # p 209
A85-23243 # p 179	A85-23300 # p 181	A85-25089 * # p 204	N85-18562 # p 175	N85-19662 * # p 209
A85-23244 # p 165	A85-23301 # p 167	A85-25199 # p 195	N85-18563 # p 185	N85-19663 * # p 209
A85-23245 # p 179	A85-23302 # p 181	A85-25509 # p 205	N85-18564 # p 175	N85-19665 * # p 209
A85-23246 # p 165	A85-23303 # p 167	A85-25511 # p 205	N85-18565 # p 175	N85-19666 * # p 210
A85-23247 # p 179	A85-23304 # p 181	A85-25512 # p 205	N85-18566 # p 175	N85-19667 * # p 210
A85-23248 # p 179	A85-23305 # p 181	A85-25514 # p 205	N85-18567 # p 206	N85-19668 * # p 210
A85-23249 # p 179	A85-23306 # p 182	A85-25515 # p 205	N85-18568 # p 206	N85-19670 * # p 210

A
C
C
E
S
I
O
N

N85-19671

ACCESSION NUMBER INDEX

N85-19671 # p 210
N85-19672 # p 210

1. Report No. NASA SP-7011 (272)	2. Government Accession No.	3. Recipient's Catalog No.	
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